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NOTE.—Communications relative to the editorial management should be addressed to MR. ROTHWELL. Articles written by MR. RAYMOND will be signed thus *

Business communications for the Western Department should be addressed to the Western Office at Denver, Colo.

CONTENTS.

EDITORIALS:

American Institute of Mining Engineers 235
The Eureka-Richmond Case 235
The Improvement in Business 235
Communism or Despotism 235
Delaware & Hudson Canal Co.'s Report.—III 235
Summer Trips Among the Mines—No. 5 236
Books Received 237
New Publications 237
Valley of Colorado River.—IX 238
The Eureka-Richmond Decision 239
The Carburation of Iron 240
Classification of Coals 241
The Utah Mining Districts.—VI 241
Combustion Temperatures 242
Mining News 243

PETROLEUM NOTES:

Production, etc. of Penna. Oil Fields 243
Petroleum Discovery in Kentucky 243
Ortega Hill Oil Company 244
Wages in the Oil Regions 244
The Petroleum Industry in Russia 244
Pipe Mileage in the Penna. Oil Region 244
The Petrolia, Canada, Oil Market 244
Santa Clara (Cal.) Petroleum Co 244
Deodorizing Petroleum 244
Purchase of Empire Transportation Co. 244
Position of Petroleum Measures in the Clearfield, Pa., District 244
The New York Market 244
The Gravel Bed Oil Wells 244
The Standard Oil Company 244

NOTES:

Action of Sea-water on Copper, etc 238
Final Closing of Cumberland (Md) Roleing Mills 244
Important Suit for Mining Lands 244
Owners of Mining Rights 245
Comparative Explosiveness of Nitro-Glycerine 245
German Coal 245
Resumption of Miners and Iron Workers 245
Cerro de Pasco Silver Mines 245
Instrument for Underground Leveling 245
Assay Department 245
COAL TRADE REVIEW 246
IRON MARKET REVIEW 247
METALS 248
Salt Lake City Ore Market 250
FINANCIAL:
New York Stocks 250
Philadelphia Stocks 250
Copper Stocks 250
Gold and Silver Stocks 250
Gas Stocks 250
Advertisers' Index 251

TABLE FOR THE CONVERSION OF ENGLISH AND METRIC UNITS.

This table will be published every week in the ENGINEERING AND MINING JOURNAL. It is based on the authority of RANKINE, and is correct to the fourth decimal place.

1 Meter = 3·2807 feet.
1 Foot = 0·3048 m
1 Liter (vol. of 1 kilog. water) = 0·2202 gal.
1 Gallon (vol. of 10 lb. water) = 4·541 liters.
1 Kilog. per sq. meter = 0·2048 lb. per sq. ft.
1 Kilog. per sq. mm. = 1422·28 lb. per sq. in.
1 Lb. per sq. in. = 703·0958 kilog. per sq. m.
1 Gramme = 15·4323 gr.
1 Grain = 0·0648 gram.
1 Kilogrammeter = 7·2331 ft.-lb.
1 Foot-pound = 0·1383 kgm.
1 Atmosphere = 14·7 lb. per sq. in. = 10·333 kilog. per sq. meter = 29·922 in. or 760 mm. of mercury = 33·9 ft. or 10⅓ meters water.
1 Kilogramme = 2·2046 lb. av.
1 Pound av. = 0·4536 kilog.
1 Deg. centigrade = 5-9 (deg. F. —32°).
1 Deg Fahrenheit = 9-5 deg. C. + 32°
1 Calorie (kilog. water raised 1° C.) = 424 kilogrammeters = 3·9683 heat-units.
1 Heat-unit (lb. water raised 1°F.) = 772 ft.-lb. = 0·252 cal.

WANTED—BACK NUMBERS OF THE ENGINEERING AND MINING JOURNAL.

A liberal price will be paid, in cash or subscriptions, for the following numbers of the ENGINEERING AND MINING JOURNAL:

Year.	Vol.	Numbers Wanted.	Year.	Vol.	Numbers Wanted.
1872	XIV.	1 to 18 inclusive.	1875	XIX.	14, 15.
1874	XVIII.	4, 11.	1875	XX.	7, 12, 22, 23.

Address this office.

AMERICAN INSTITUTE OF MINING ENGINEERS.

The October meeting of the Institute will begin on Tuesday evening, October 23. We are informed by the Secretary of the Institute that the meeting will probably be held in Poughkeepsie, N. Y. Definite notice of the meeting will be given in the JOURNAL of next week.

We publish this week the decision of the Circuit Court of the United States, delivered at San Francisco, August 22, by Mr. Justice FIELD, in the Eureka-Richmond case. As it confirms the statements made by us in a recent article, before we had received the full text, we need not comment upon it further at this time. *

THE IMPROVEMENT IN BUSINESS.

There can no longer be any doubt about the general improvement not only in "feeling," but in actual business throughout the country.

WE HAVE PASSED THE TURNING-POINT, AND ARE FAIRLY STARTED ON THE UPWARD ROAD TOWARDS A RENEWED PROSPERITY.

This opinion we would gladly have been able to express at any time within the past four years of gloom and disaster; but the first duty of an honest journal is to report what is not what it would like to be, and the subsequent events but too well verified our repeated reports that "the end is not yet." Now, however, we believe the gloom is rising, and we find an unmistakable improvement in most branches of business. We do not expect any great advance in prices. Some articles, indeed, will probably yet recede, but consumption is increasing, and a speculative feeling is beginning to show itself in many directions where it has been totally absent for three years past. No doubt the harvesting of abundant crops, and the wonderful richness of our mines, have turned the scale; and the ever hopeful and enterprising spirit of our people will find encouragement in the signs, and lead them how to launch out in new fields of industry.

The return of business prosperity will, however, be somewhat slow. The turning point does not appear to have yet been reached in England and most of the European countries, and this must necessarily tend to retard us here; and no doubt many sanguine people will wreck their fortunes by overestimating the force of the revival which they themselves are helping to bring about. It is sufficient at present to chronicle the fact that a general revival of business appears to have really set in, and though it may be of slow, yet we hope it will be of steady growth.

The signs of the times are certainly such as to justify the investment of new capital in productive industry, though they as certainly call for the utmost care and prudence in making these investments.

COMMUNISM OR DESPOTISM.

The article in the *International Review* for September and October, from the pen of Mr. W. M. GROSVENOR, on "The Communist and the Railway," is a refreshing piece of plain talk. Mr. GROSVENOR traces the element of Communism through the Granges, the Trades Unions, the inflation and repudiation party, and finally to its recent outbreak in strikes and riots, and shows that, if unchecked, it will lead to the invariable reaction of despotism, in some form or other. We are far from believing such an alternative to be imminent; but the peril is to be averted only by the educated good sense of the American people; and this can be aroused only by such clear revelations of mischievous tendencies at work in the community as Mr. GROSVENOR has furnished. His article is full of epigrammatic statements, which expose sophistry with the touch of wit. What can be more pithy and forcible than such sentences as the following?

"Communists have a favorite theory that 'the world owes every man a living.' To this pretext for indiscriminate pillage, there is always mentally added an unwritten clause—that the living which the world owes any man is that which suits his habits and tastes."

"The man who 'cannot live on the wages offered' must remember one fact: other men can. The proof is, the strikers resorted to force."

"Crime against self, crime against free labor, crime against society, crime against property—such is the Communistic trades unions. By its fruits we know it at last."

The most trenchant part of the article, however, is its demonstration that, when the railroad strikers appealed to public sympathy as suffering an intolerable grievance, their appeal was a false pretense. They were trading on the humane feelings of their fellow-citizens as really as the begging impostor trades on the kindly impulses of the charitable.

It is related of a criminal convicted in a French court of the murder of his aged father and mother, that, when asked what he had to say before the sentence should be pronounced, he made an eloquent appeal for mercy on the ground that he was an orphan. Scarcely less audacious is the complaint of the train-hands who, as Mr. GROSVENOR shows, having been overpaid in the past, and having helped to bring about the necessity of retrenchment in railroad expenses, now plead that they should be specially pitied because they cannot live as they used to live, and will not live as thousands of equally competent laborers would be glad to live, on wages proportioned to the times. The general labor question is by no means to be settled in an article; but Mr. GROSVENOR has settled it for the class which recently appealed to violence as an argument. No reader of his essay will waste any sympathy upon them. *

THE DELAWARE & HUDSON CANAL COMPANY'S REPORT.—III.

(*Continued from page* 218.)

COAL LANDS.—In the last number of the JOURNAL, pages 217 and 218, we showed that the 20,042 acres counted as coal land by the company, and containing 11¼ feet in thickness of coal, stand charged on the books at $6,862,552, or $342 an acre, equal to $30.40 per 1,000 tons to the acre; while by the distinguished gentlemen whose names adorn this report these lands are valued at $500 an acre, or $44.44 per 1,000 tons to the acre. And the officers of the company in their annual report, made for the information and guidance of stockholders, value the same lands at $20,000,000, or almost $1,000 an acre. Equal to nearly $89 per 1,000 tons to the acre.

Since we are not given any information as to the basis of Mr. VANDLING'S estimate, we assume it to have been 1,000 tons of coal to the acre, as corresponding with one foot in thickness; an assumption that is certainly liberal to the company, for it supposes Mr. VANDLING to have allowed one-half of all the coal to be lost in pillars and waste.

In the absence of that brilliant imagination which can manufacture assets by a stroke of the pen out of other people's property, and can find values of transportation lines by "capitalizing at 7 per cent." fictitious profits which have no more foundation than "the baseless fabric of a vision," we may suggest a fair, plain, common sense method of valuation of these coal lands.

Let us compare them with coal lands with whose product they have to compete in market. Those of the Philadelphia & Reading Coal and Iron Company offer a fair and reasonable standard for such comparison. These lands, amounting to 95,714 acres, or nearly one-third of all the anthracite coal lands in Pennsylvania, were all purchased since the war, and, therefore, during the reign of high prices. No doubt their market value is less to-day than it was then; but without discussing the question whether they cost too much or too little, we can use them as a fair basis of comparison. The last report of the Philadelphia & Reading Company tells us, on the excellent authority of Mr. HENRY PLEASANTS, the mining engineer of the company, that these lands contain 4,476,009,390 tons of coal, and they cost $40,951,300, or $428 an acre. If we allow, as we have assumed Mr. VANDLING

has done, one-half of the coal to be lost in pillars and waste, we get available coal 2,238,004,695 tons, or 23,380 tons to the acre, and the cost $18.30 per 1,000 tons to the acre, as against $30.40, $44.44, or $88.88 per 1,000 tons per acre valuation of the Delaware & Hudson Company's property, according as we accept the figures as they appear on the books, those guessed at by the committee, or those dictated by the officers of the company. In other words, the coal lands of the Delaware & Hudson Canal Company, taken upon the basis of equal amounts of coal, are valued in the very lowest of these statements at nearly double those of the Reading; in the committee's balance sheet they are valued at nearly two and a half times as much; while the officers would have their stockholders and the public believe that these coal lands are, "even at the present low values," worth nearly five times the open market value at which nearly one-third of all the anthracite lands of Pennsylvania were purchased during the inflation years previous to the decline to "present low values." Does it need anything more to show the value of the balance sheets which have been offered to the stockholders and the public, as proving the company to be "solvent and strong beyond question"?

Is it claimed that these lands have any advantage in facility in mining or in accessibility to market over those of its rival, the Reading? We may point to the reports of the two companies for 1876, from which we learn that the average cost of mining Reading coal during that year was $1.33 per ton, while that of the Delaware & Hudson Company was $1.37 per ton—assuming, as is reasonable, that the company paid no more for contractors' coal than it cost to mine its own. This company's reports are exceedingly reticent on this important point of "cost of mining"; but we have reason to believe, from non-official data, that this figure is certainly not less than "cost." The superior advantages in accessibility to market of the lands we have taken as the standard of comparison have been abundantly shown during the present season, when the Reading has constantly been able to undersell the Delaware & Hudson, and has increased the output of its mines from January 1 to July 2 (when the Delaware & Hudson mines were stopped by a strike) 58 per cent. over its product during the same period last year, while the Delaware & Hudson increased its product only 27½ per cent., and then had such accumulations of coal in stock that two months of strike have not yet sufficed to exhaust them.

Measured by this favorable standard of value ($18.30 per 1,000 tons to the acre), the coal lands of the Delaware & Hudson Canal Company would be worth $4,126,000 (nearly $206 an acre), as against $6,862,522, at which they stand on the books, and $12,615,000, at which they are placed on the committee's balance sheet. Ah! but the effect of such a basis of valuation on the credit side of the balance sheet is "wrecking."

LEASED LANDS.—These appear to be held on somewhat onerous terms, a minimum royalty of $186,271 a year being one of the fixed charges of the company, just as much so as the rental of a leased railroad, though it does not anywhere appear on record among the liabilities of the company. This royalty, we learn from the report, amounts, on an average, to about 26 cents a ton—a figure which is a full average of the royalties paid in the Wyoming region. If the company should make default upon these royalty payments, the lessors could recover possession of their property, and the company would sink the money invested in mine improvements upon these lands.

The amount of royalties paid in advance by the company was, at the close of 1876, $521,179, or about $102 an acre on all the land leased by the company. These 5,077 acres will yield, according to Mr. VANDLING, 116,048,120 tons of coal, or 22,800 tons to the acre. They, therefore, contain about twice as much coal to the acre as the lands owned by the company.

OPENING MINES AND IMPROVEMENTS.—These works are valued by the committee at $3,300,000, or somewhat less than $100,000 to the 100,000 tons, estimated maximum annual capacity of production. The committee thinks these works could not be replaced at present for less than this gross sum, though they stand on the books at $2,373,265. It is a pretty large amount for a non-expert committee to guess at, but then it adds $926,735 to the officers' balance sheet, and helps to swell these elastic assets to proportions that will justify a new loan, and, incidentally, help up the stock.

The committee states that these improvements will suffice for the production of all the coal the company will require for many years to come, and, as if to show the value of this opinion, it says: "These conclusions are based upon the fact that continuous mining has been prosecuted for more than twenty years through a shaft sunk on a 'lean' portion of the company's land, and twenty years of continuous work will still be required to exhaust the coal which may be economically mined therefrom." Indeed, but how about the Conyngham Shaft, sunk on a "fat" portion of the property—near Wilkes-Barre—on which very large amounts of money were expended, and yet it never produced any coal at all, and had to be abandoned?

It would also be of interest to know to what account such improvements as these have been charged, and whether they appear as valuable assets. The committee might at the same time have told us whether the work of trying to extinguish the fire in the Baltimore mines (which still burns and is likely to do so for many years to come) actually cost, as is currently reported, three quarters of a million dollars, and to what account this expenditure has been charged. Is it an "improvement" which appears in the assets?

It may assist non-professional readers to know that mine improvements are frequently placed for convenience in two classes: 1. Permanent improvements, such as shafts, slopes, rock tunnels, etc., which may be replaced by a sinking fund of from 3 to 5 per cent annually on their cost, the percentage depending on the amount of coal reached by the improvement. 2. Perishable improvements, which include breakers, machinery, etc., and usually require an average of 10 per cent. annually to provide for their renewal. These figures do not include repairs which are chargeable to current coal account. The improvement account is one subject to great abuse, and when a property has been opened to a capacity as great as that claimed in this case, perhaps the safest way is to close the account, as the Reading Coal & Iron Company has done, and charge to current coal account all expenditures for improvements of every kind.

COAL ON HAND.—The quantity of coal on hand

December 31, 1875, was 265,454 tons, valued at $2.78 per ton.
" " 1876, was 240,322 " " 2.91 "

It will be remembered that the market price of coal during the year had declined some $2 a ton in New York, consequently it is not clear upon what basis of valuation the coal on hand is stated in the balance sheet to be more valuable than when it could be sold for nearly double the price.

The most of this coal was at Honesdale and on the Gravity road, still nearer the mines, from whence its carriage to New York would cost about $1.25 per ton, while in the market here at the close of 1876 it would not have brought more than $3.25 per ton. Yet this coal is valued at $2.50 a ton, and that at Rondout and Weehawken is valued at $3.50, the whole averaging $2.91, or nearly $1 a ton more than its market value. It is true, this only makes a difference of a quarter of a million dollars—a mere bagatelle. But the committee has itself given the necessary data to show the absurdity of valuing any part of the coal on hand at the figures mentioned. We have only to divide the cash received from sales of coal throughout the year (during 8 months of which the combination held the price up to very high figures) by the tons sold, and we find the average price received was but $3.19 per ton.

VALUATION OF THE COMPANY'S INDORSEMENT.—It is, perhaps, needless to give further instances of the wild and unreliable nature of the valuations by which such satisfactory results are shown on the balance sheet; but we cannot refrain from some mention of the basis on which the committee values and places in the assets at par the stocks and bonds of leased lines, on which the dividends and interest are guaranteed by the Delaware & Hudson Canal Company itself, though without that guarantee even this committee would not pretend that these assets have any material value. *This idea of including its own indorsement in its balance sheet as available assets* is certainly an astonishing piece of "financiering." It is clearly the invention of the same brilliant genius that obtained the value of the canal by "capitalizing at 7 per cent." fictitious profits, and that swelled the company's assets by simply including two and a half million dollars of other people's property as its own.

Who can withhold his admiration from this latest and most exquisitely simple device for manufacturing assets? Henceforth all that is needed to show any concern to be "solvent and strong beyond question" is that it indorse all the notes of its insolvent creditors and all its bad debts, and if these are not sufficient it can readily buy at the price of waste paper any desirable amount of such 7 per cent. "securities" and simply indorse them, when suddenly they become "worth par," and can be included in the assets which show the concern to be "financially strong"—and ready to make another loan.

This marvelous system of financiering is "indorsed" by a committee composed of the eminent financial authorities JOHN V. L. PRUYN, ADOLPHUS HAMILTON, H. M. OLMSTED, HENRY H. FARNAM, and E. B. GRANT, and their "indorsement," we suppose, should make it "worth par."

We note that the committee writes off as without value about 5⅛ million dollars of the assets included in the officers' balance sheet, and when *this committee* writes them off we are doubtless quite safe in considering them as having no value in fact.

We shall leave to our next issue the discussion of the committee's statement that at a selling price of $3 a ton for coal the company can meet its fixed charges, and we shall then also review the question of dividends as compared with growth of capital and debt, and other matters of general interest.

SUMMER TRIPS AMONG THE MINES—No. 5.

Staff Correspondence of the Engineering and Mining Journal.

CENTRAL CITY, COLORADO.

For a number of years this rich gold mining town has enjoyed the distinction of being the most unattractive city to be found within the range of many hundred miles. Located in a basin in the range, and in such a position that none of the truly fine scenery which is distant only a few miles can be seen from its streets; surrounded by and lying among low and rather tame hills, whose outlines present no striking features, and whose once extensive forests have long since disappeared; and stretched for nearly three miles on both sides of a tortuous, narrow, and steep gulch, the location of this famous camp does not strike the visitor as either pleasant or advantageous. There is a lack of that symmetry in the outlines of the settlement which, to Americans at least, appears necessary; and to the indolent, or to him who is short of wind and meager in muscle, there appears to be too much uphill work to render life in Gilpin County an unmixed blessing. Coming up the cañon of North Clear Creek, the

outposts of the town are first recognized in the gulch mining operations at the mouth of Russell Gulch, and a little further on one begins to scent the villainous vapors from the Boston & Colorado Smelting Works. In old times (it seems a long time ago now, though not four years) when Black Hawk was reached by stage from Golden, what a glorious time pilgrims had in struggling with these sulphurous fumes, as the lumbering, heavy coach dragged its way at a snail's pace up the steep grade, past the huge piles of wasting pyrites! For a good quarter of a mile, if not more, this entertainment was forced upon all, men and beasts, and as a natural consequence the camp gained a reputation for cough-compelling odors that it has always since retained, and probably always will, unless Prof. STILL of the smelting works kindly consents to move away into some more easily ventilated locality. Now, however, the stumpy and noisy little locomotive rattles its way up the heavy grade at a lively rate, putting on additional steam at the works, as if itself suffering from the choking gases of the ore heaps, and very anxious to get away; and before one has fairly realized that the town is reached the train has plunged into a long stone building (an old mill) some distance above the smelting works, and is at its journey's end in the town of Black Hawk.

There is a peculiarity about this town and its continuations, Mountain City, Central, and Bald Mountain, which is not noticeable in many other places. The gulch is so narrow that it affords but one street, which wanders along the side of the muddy stream in an exceedingly tortuous style. Consequently, the town lots are to all intents and purposes set up on edge, with their front commencing on the first piece of solid rock off the street, and their back tilted up on the mountain side at almost any angle you may choose. To reach a front door one must climb up a steep pair of stairs, often 10 or 15 feet high, and a fall off a front porch is a matter requiring the immediate assistance of the surgeon. On the other hand, back doors, in a majority of cases, open directly upon a solid face of granite, and it is frequently possible to pass without effort or discomfort directly from the rear of the roof to the ground. This little peculiarity strikes one very forcibly in going up through the one narrow street of Black Hawk, and is only partially driven from the mind when the little triangle of level ground at the mouth of Gregory Gulch is reached, where the main road branches off towards Central.

Here one obtains a better view of things. The gulch in places broadens out to the enormous width of 150 feet, and looking ahead one sees up the hill the hundreds of dumps and shaft-houses on Bobtail and Mammoth hills. For a short distance a better class of buildings prevails, brick and stone stores of good width, depth, and height line the street, and it is evident that one is passing through the retail-trade quarter of the settlement. But this improvement is only temporary. The hotel 'bus toils on up the steep grade, past a most depressed and dejected line of shanties, then by the side of huge stamp-mills, and past the mouths of tunnels and mines. There is a long half mile of this work before one reaches Central, and is set down before the handsome brick building of the Teller House, within whose doors are found all the comforts of civilization, and at the same time enough of that freshness and vigor which is peculiar to Western life, to prevent one imagining himself back in the East again.

From the porch of the Teller some of the great hills on which are the gold mines may be seen. Gunnell Hill is directly behind the hotel, Winnebago, or Custo, is directly in front of it. Looking down the gulch, Bobtail and Mammoth hills appear on the right, and to the left the Pat Casey road, winding around the mountain, disappears over into Chase Gulch. Going down Eureka Street, on which the Teller House stands, to its junction with Main Street, and looking up the latter, one catches a view of the lower end of Quartz Hill, which is one of the most famous gold localities in the West. All around are large, fine brick stores, fitted with iron fronts and plate glass windows, and every other evidence of a thriving and prosperous town. In fact, as far as nature and the laws of gravity would permit, Central has been improved, and is, after all, a locality not to be despised.

The mountains around are a network of gold veins, from the bowels of which have been taken since 1859 nearly $50,000,000 in precious metals. When the gulch was first found by Gregory and his party, its gravelly bottom was loaded with the yellow dust, and on the hillsides the outcropping veins were decomposed to the depth of fifty feet, and yielded gold in abundance. It was several years before these rich surface deposits were exhausted and real quartz mining begun; but as soon as capital interested itself in the deep working of the lodes, it was found that the district possessed resources that could not be exhausted for generations. Gradually, and with many difficulties, these huge veins have been opened, until at present hardly a district in the West can show the solid prosperity of Gilpin County, and certainly no single gold producing camp in America outside of Virginia City can rival it. A few dry details under this head will perhaps be interesting. The mines are now producing about 2½ millions annually. An average of 600 stamps are kept steadily running on the lower grades of ore, and about $1,500 daily in high grade ore is sold to the smelting works at Black Hawk. Ten of the mines have been opened to a depth of 700 feet and over with most gratifying results, better ore and in larger quantities being now found at this depth than at any higher level. One can spend a week comfortably and pleasantly in this vicinity, examining the large mines and studying the mills, which will compare favorably with those of any other locality; and if enough interest is taken by the traveler to examine carefully the details of gold mining and to submit it as an industry to a common sense business test, it will be an easy matter to dispose, in this case, of the old idea that "it takes one gold mine to work another."

BOOKS RECEIVED.

[Those marked * will be reviewed in subsequent numbers of the JOURNAL.]

THE SANITARY CONDITION IN CITY AND COUNTRY HOUSES. By GEORGE E. WARING, Jr. New York: D. Van Nostrand. Pp. 145. Price 50 cents.

* INTERNATIONAL EXHIBITION, 1876—Reports and Awards, Group II. Edited by FRANCIS A. WALKER. Philadelphia: J. B. Lippincott & Co. Price $1.50.

* A TREATISE ON THE USE OF BELTING FOR THE TRANSMISSION OF POWER. By JOHN H. COOPER, Mechanical Engineer. Illustrated. Philadelphia: Claxton, Remsen & Haffelfinger.

* REPORTS OF THE INSPECTORS OF MINES OF THE ANTHRACITE COAL REGIONS OF PENNSYLVANIA FOR THE YEAR 1876.

A GENERAL CLASSIFICATION OF RAILWAY RIGHTS, REALTIES, AND PERSONALITIES. Designed to facilitate the work of taking an accurate inventory of such property. By GEORGE T. BALCH, C. E.

NEW PUBLICATIONS.

We are indebted to Dr. C. LE NEVE FOSTER, Inspector of Mines, Truro, Cornwall, for several interesting papers, on mineralogical, chemical, and geological subjects. Dr. FOSTER's constant and intelligent activity is notably enriching our professional literature. Of the present series of papers, the "Remarks on some Tin Lodes in the St. Agnes District" and "On a Deposit of Tin at Park of Mines" are particularly valuable, as presenting clear and reasonable theories of vein-formation, accompanied by diagrams which, to the engineer and geologist, are better than words. *

The Programme of the Royal Rhenish-Westphalian Polytechnic School, at Aix, for the year 1877-78, lies before us. This school, opened in October, 1870, has now about 350 regular students, and 90 students upon special courses. It is provided with a splendid building and a large corps of instructors. The range of subjects covered by the different courses is very large. There is no attempt to give shop training, the only practice included in the curriculum being in such departments as drawing, chemical analysis, physical laboratory work, determination of minerals, etc. It must be remembered, however, that the native graduates of such a school find opportunities for practice in subordinate positions more easily in Germany than in America. It is harder to start here, though, perhaps, promotion is more rapid to those who have merit and ambition. *

The report of President RUNKLE, of the Massachusetts Institute of Technology, for the year ending September 30, 1876, justifies, by the importance of its contents, the delay which has attended its publication. It presents a picture of the actual working of a technical school, which instructors in that department may study with advantage. We quote the following suggestive explanation of the Russian system of shop work instruction, of which President RUNKLE is an ardent advocate, and for his full discussion of which we refer our readers to the report itself, where they will find also many other facts bearing upon the great problem of combining practical training with theoretical training:

"Since the issue of my report upon the Russian system of shop-work instruction for engineers and machinists, so many persons who have read it have asked me if I would give them a simple, concrete illustration of the system, that I fear I may have failed to make the matter entirely clear, and I will try, in a simple way, to present the idea, which would be entirely unnecessary if I could only show the series of instruction-samples made in the several shops, now on exhibition at the Centennial.

"Clearly, the first step in practical mechanism is to teach the use of tools. Suppose that we have, say, fifty young men to teach. Now we can put the same tool or set of tools into the hands of each, and teach all together, as a class, or we can put a different tool or set into the hands of each, in which case the instruction becomes special to each, or individual instruction. In the first case, one teacher can systematically teach the whole class, and in the second case, to give each pupil equally good instruction, it will need as many teachers as pupils, without some of the teachers happen to be experts in the use of more than one set of tools; and at best it would clearly require in the second case several teachers. It must be plain that on all accounts it will be best to follow the class system, and teach all the use of the same tool or set of tools at the same time. It follows, then, that our shop must be fitted with fifty sets of tools, if this happens to be the number of students which can be well taught at once.

"Now, it is plain that, to learn the use of the set of tools selected as the beginning of the course, a certain number of forms must be worked out, the number being determined by the amount of skill which it is important the particular class under instruction should acquire. Next, what should guide us in the selection of the forms to be worked out? If we examine a certain number of constructions, say machines made entirely of metal, we shall find that some of the parts are made or finished with the set of tools under consideration. Now, it is not necessary that we should select these exact forms, but the whole end will be gained by devising and working out a series of typical forms, each of which will only vary from the actual ones to a limited extent, according to the special construction in which it may be needed. When the course in the first shop, say the filer's shop, is finished, the class is put into a new shop to learn the use of another set of tools, and so on, until the use of all the tools used in the construction of wood and the metals is learned. It will be seen, then, that the samples made in each shop are made simply and only for instruction, in order that no conditions may enter to interfere with the system best adapted for this end. Next, it must be remembered that, while the class is learning the manipulations of each set of tools, and thus learning at the same time to construct *a typical alphabet of mechanism*, the theory involved in the construction of the tools is systematically taught—that is, the reason why each tool is so made and how it must be kept in order. Besides, each sample is made from drawings which the student has previously made, thus making this instruction also conform to actual practice.

"Thus far the whole aim has been to give the student skill in the use of all the tools pertaining to the course, and now, and not before, he is prepared to be transferred to a construction shop. The Russian system is, then, a fundamental analysis of the problem of practical mechanism, and consists in teaching the theory and use of tools to classes of students in the same orderly and progressive way in which any other subject is taught, with the same supervision and instruction of a specially qualified teacher, holding each student to the same account and giving him the same credit as in the other studies. In this way of teaching it the study of practical mechanism also becomes a discipline of positive value in a system of instruction. The theories involved in the construction of machinery have nothing to do with learning the use of tools, and the entire aim in a construction shop is the production of results based on the skill of the workmen engaged." *

THE VALLEY OF THE COLORADO RIVER, AND ITS GEOLOGY.—IX.*

GLEN CANON.

The deepest part of Glen Cañon is found in the bend to the north, several miles above the mouth of the Paria, where the river runs through the variegated beds. Its entire course is through rocks of Triassic Age, chiefly red sandstones. These rocks, beautifully exposed in the Orange Cliffs, return to the river down the western bank of the Dirty Devil, and we enter them again immediately below the mouth of that stream; and here we pass around the lower end of the fold which brought up the lower carboniferous limestones and sandstones through which Stillwater, Cataract, and Narrow cañons are excavated. The group of mountains discovered in coming down Narrow Cañon is composed of eruptive rocks in part, but only in part. Quantities of molten matter poured out through some fissures here, and spread over the country before it had been eroded to its present depth; and this harder material, which came from the depths below, protected the sandstones, over which it was spread, from the degradation which befell the extension of the beds beyond the capping trachyte. The base of the mountain is composed of sedimentary beds, and the summit of this, cooled lava. So even these so-called eruptive mountains were not piled up, but were carved from beds of sedimentary and igneous matter. We have named this group, in honor of the Secretary of the Smithsonian Institution, "Henry Mountains."

A few miles below the mouth of the San Juan River we come to an interesting monoclinal fold, where the dip of the rocks is in a direction a little north of east; that is, the beds are dropped down on the eastern side of the line, which trends nearly north and south, not broken off and dropped down, but flexed, or bent, so that the beds on the western side of the line are found at an altitude many hundreds of feet above those on the east, and farther down the river the rocks exposed at the water edge are of greater age than those above.

Hereafter, in this discussion, I shall more fully explain the nature of these monoclinal folds and faults, and the topographic features to which they give origin.

At the foot of this cañon another monoclinal fold is seen, with the throw or drop also on the east side, or the uplift, if one is so pleased to term it, on the west side; and this brings up again carboniferous sandstones and limestones. The surface of the country immediately outside the cañon, along its whole course, is on the summit of the red Trias; but, away back on either side, we see long lines of towering cliffs, now running in this, now in that direction, still keeping their courses parallel to the axes of folds which are scattered in many directions over the country. A region more desolate, and, for all economic purposes, more valueless, perhaps, cannot be found on the continent.

There are some features of this cañon of great interest, which I have already mentioned in the account of the exploration. These are the chambers, or caves, found along the cañon, at the foot of the wall, here and there, or in the side cañons and gulches; the great mural cliffs about sweeping curves of the river; terraced glens, where the walls are composed of well-defined strata, with springs about which oak and aspens grow; and the deep, narrow alcoves or side gulches.

The origin of these chambers may be thus explained. They are due to the crumbling of softer rocks which underlie harder beds, the friable material being carried away by springs or wet weather streams. The greater number are found at the heads of little gulches.

In many places the walls of the cañons are of homogeneous sandstone, and where the river sweeps in a great curve at the foot of the wall, mural cliffs are found.

The oak glens have been excavated by springs, and the alcoves are the channels of intermittent rills.

Away from the river, on either side, there are broad stretches of naked sandstone, carved by the rains into gentle billows or mounds. As the rains gather into streams, the little valleys, or grooves, between the mounds become gulches, and where the smaller streams gather into larger the gulches become cañons, often having vertical or even overhanging walls.

When in the progress of corrasion these streams have cut through harder beds and reach softer, the channels are seen to widen. The manner in which this widening occurs is curious. The streams are everywhere tortuous, and, as the power of the water is constantly exerted in corrasion, the streams are not only made deeper, but the curves are increased by methods well known to those who have studied the origin and change of river channels; so the walls are often undermined on the outer side of the curves, and here overhanging cliffs are found.

So these cañons are not only flexuous in horizontal outline, but they are also flexuous in vertical outline, giving them warped or tortuous courses. The streams do not always cut channels with vertical walls. Occasionally, deep water-ways are found, with flaring walls to the very bottom. Such cañons usually occur where the beds of streams are in rocks quite as hard, or even harder, than those above. A good illustration of such a channel is seen in the Escalante basin. Besides the grooves, gulches, and cañons that head among the mounds, we have another class of water-ways, to which the former are sometimes tributary. Many streams come down from distant mountains, where they receive a more constant supply of water. They often run for many miles through narrow, winding cañons, with walls so precipitous that they cannot be scaled, and they form impassable barriers to the traveler.

Other interesting features of the landscape are found in the great monuments and buttes that are scattered here and there, attesting to a former extension of the beds seen in the more distant cliffs. Of the cliffs more will be said hereafter.

Glen Cañon is the channel which the Colorado River has cut for itself through beds of red and orange sandstones. Its head is at the mouth of the Dirty Devil, and its foot at the mouth of the Paria. It terminates abruptly below by an escarpment which we have called the "Vermilion Cliffs." Along this irregular line, extending from east to west across the Colorado, and far back on either side, the general surface of the country suddenly drops down.

FIG. 23.—VIEW OF MARBLE CANON FROM THE VERMILION CLIFFS, "NEAR THE MOUTH" OF THE PARIA.

In the distance, the Colorado River is seen to turn to the west, where its gorge divides the twin plateaus. On the right are seen the Eastern Kaibab Displacements, appearing as folds, and, farther in the distance, as faults.

MARBLE CANON.

The escarpment which we call the "Vermilion Cliffs," at the foot of Glen Cañon, exposes the same beds as are seen in the face of the Orange Cliffs, at the foot of Labyrinth Cañon. It will be remembered that the beds exposed in the Terrace Cañons dip to the north. Between the Orange Cliffs and the "Vermilion Cliffs" the strata are variously dipped by monoclinal folds, having their axis in a northerly and southerly direction, and the red beds are at about the same altitude above the sea at two points. The "Vermilion Cliffs" which face the south form a deep, re-entering angle at the mouth of the Paria to the mouth of the Colorado Chiquito.

The general surface of the country between the two points is the summit of the carboniferous formation. At the mouth of the Paria this is at the water's edge; at the mouth of the Colorado Chiquito it is 3,800 feet above the river. The fall of the river, in the same distance, is about six hundred feet, so that the whole dip of the rock between the two points is about 3,200 feet. The distance, by river, is sixty-five miles; in a direct line, about twenty miles less. So we have a dip of the formation of 3,200 feet in forty-five miles, or about seventy feet to a mile. The slope of the country to the north is the same as the dip of the beds, for the country rises to the south, as the beds rise to the south.

Stand on the "Vermilion Cliffs, at the head of Marble Cañon, and look off down the river over a stretch of country that steadily rises in the distance until it reaches an altitude far above even the elevated point of observation, and then see meandering through it to the south the gorge in which the river runs, everywhere breaking down with a sharp brink, and in the perspective the summits of the walls appearing to approach until they are merged in a black line, and you can hardly resist the thought that the river burrows into, and is lost under, the great inclined plateau.

RESISTANCE OF COPPER AND PHOSPHOR-BRONZE TO ACTION OF SEA-WATER.—The power of resistance to the action of sea-water possessed by copper and phosphor-bronze respectively is shown by the result of an experiment made under the auspices of the Russian Government. The experiment lasted for six months, and at the end of that time it was found that the copper (which was of the best quality) had lost over three per cent. of its weight, while the loss of phosphor-bronze was but little over one per cent.

* Extracts from Report of Major J. W. Powell on *The Exploration of the Colorado River of the West*. Washington, 1875.

THE EUREKA-RICHMOND DECISION.

THE OPINION OF THE CIRCUIT COURT OF THE UNITED STATES, FOR THE DISTRICT OF NEVADA, IN THE CASE OF THE EUREKA CONSOLIDATED MINING COMPANY *vs.* THE RICHMOND MINING COMPANY, OF NEVADA, DELIVERED AT SAN FRANCISCO, AUGUST 22, 1877, BY MR. JUSTICE FIELD.

Explanation.—This case, by stipulation of the parties, was tried in San Francisco, before the Hon. Stephen J. Field, Justice of the Supreme Court of the United States, the Hon. Lorenzo Sawyer, United States Circuit Judge of the Ninth Circuit, and the Hon. E. W. Hillyer, United States District Judge for the District of Nevada.

The hearing began on the 23d of July, 1877. The witnesses occupied two weeks, and the argument of counsel three days. It was argued for the plaintiff by Messrs. Heydenfeldt, H. I. Thornton, and Mesick; and for the defendant by Messrs. S. M. Wilson and Thomas Wren. After the conclusion of the argument, the Court held the case under advisement until the 22d of August, when Mr. Justice Field delivered the unanimous opinion of the Court.

In the Circuit Court of the United States in and for the Ninth Circuit and District of Nevada:

THE EUREKA CONSOLIDATED MINING CO. *vs.* THE RICHMOND MINING CO., OF NEVADA.

This is an action for the possession of certain mining ground, particularly described in the complaint, situated in Eureka Mining District, in the County of Eureka, in the State of Nevada. The plaintiff is a corporation created under the laws of California, and the defendant, The Richmond Mining Company, is a corporation created under the laws of Nevada. The other defendants, Thomas Wren and Joseph Potts, are citizens of the latter State. The action was originally commenced in a State Court of Nevada, but upon application of the plaintiff, and upon the ground of its incorporation in another State, and the presumed citizenship, from that fact, of its corporators or stockholders in that State, it was transferred to the Circuit Court of the United States. The complaint in the State Court, in addition to the usual allegations of a declaration in ejectment, set forth various grounds upon which was based a prayer for an order restraining the defendants from working the premises in controversy pending the action. The defendants, in their answer to the complaint, not only denied the title of the plaintiff, but made various averments upon which a like restraining order against the plaintiff was asked. Both orders were granted. This union of a demand in ejectment for the property in controversy with a prayer for provisional equitable relief, is permitted by the system of procedure which obtains in the State, thus saving the parties the necessity of litigating in two suits what can as readily and less expensively be accomplished in one. But this union is not permitted in the Federal Courts; and upon the transfer of the present action, the pleadings of the plaintiff were amended, by substituting a regular complaint in ejectment on the law side of the Court; and a bill was filed for an injunction on its equity side. The defendants answered both, and also filed a cross-bill for an injunction against the plaintiff.

By arrangement of the parties, the defendants, Messrs. Wren and Potts, are dropped out of the controversy, and their names may be stricken from the pleadings. The claim for damages is also waived in this action, without prejudice to any future proceedings with respect to them. By stipulation the case at law—the action of ejectment—is tried by the Court without the intervention of a jury, and the judges sit at San Francisco instead of Carson, their finding and judgment to be entered in term time in the latter place as though the case were heard and decided there. The testimony taken in the action at law is to be received as depositions in the equity suit, and both cases are to be disposed of at the same time, to the end that the whole controversy between the parties may be settled at once.

The premises in controversy are of great value, amounting by estimation to several hundred thousands of dollars, and the case has been prepared for trial with a care proportionate to this estimate of the value of the property, and the trial has been conducted by counsel on both sides with eminent ability.

Whatever could inform, instruct, or enlighten the Court, has been presented by them. Practical miners have given us their testimony as to the location and working of the mine. Men of science have explained to us how it was probable that nature in her processes had deposited the mineral where it was found. Models of glass have made the hill, where the mining ground lies, transparent, so that we have been able to trace the course of the veins, and see the chambers of ore found in its depths. For myself, after a somewhat extended judicial experience, covering now a period of nearly twenty years, I can say that I have seldom, if ever, seen a case involving the consideration of so many and varied particulars, more thoroughly prepared or more ably presented. And what has added a charm to the whole trial has been the conduct of counsel on both sides, who have appeared to assist each other in the development of the facts of the case, and have furnished an illustration of the truth that the highest courtesy is consistent with the most earnest contention.

The mining ground which forms the subject of controversy is situated in a hill known as Ruby Hill, a spur of Prospect Mountain, distant about two miles from the town of Eureka in Nevada. Prospect Mountain is several mines in length, running in a northerly and southerly course. Adjoining its northerly end is this spur called Ruby Hill, which extends thence westerly, or in a southwesterly direction. Along and through this hill for a distance slightly exceeding a mile, is a zone of limestone in which, at different places throughout its length, and in various forms, mineral is found, this mineral appearing sometimes in a series or succession of ore bodies more or less closely connected, sometimes in apparently isolated chambers, and at other times in what would seem to be scattered grains. And our principal inquiry is to ascertain the character of this zone, in order to determine whether it is to be treated as constituting one lode, or as embracing several lodes, as that term is used in the Acts of Congress of 1866 and 1872, under which the parties have acquired whatever rights they possess. In this inquiry the first thing to be settled is the meaning of the term in those acts. This meaning being settled, the physical characteristics and the distinguishing features of the zone will be considered.

Those Acts give no definition of the term. They use it always in connection with the term vein. The Act of 1866 provided for the acquisition of a patent by any person or association of persons claiming "a vein or lode of quartz, or other rock in place, bearing gold, silver, cinnabar, or copper." The Act of 1872 speaks of veins or lodes of quartz or other rock in place, bearing similar metals or ores. Any definition of the term should, therefore, be sufficiently broad to embrace deposits of the several metals or ores here mentioned. In the construction of statutes, general terms must receive that interpretation which will include all the instances enumerated as comprehended by them. The definition of a lode given by geologists is, that of a fissure in the earth's crust filled with mineral matter, or more accurately, as aggregations of mineral matter containing ores in fissures. (See Von Cotta's Treatise on Ore Deposits, Prime's Translation, 26.) But miners used the term before geologists attempted to give it a definition. One of the witnesses in this case, Dr. Raymond, who for many years was in the service of the General Government as Commissioner of Mining Statistics, and in that capacity had occasion to examine and report upon a large number of mines in the States of Nevada and California, and the Territories of Utah and Colorado, says that he has been accustomed as a mining engineer to attach very little importance to those cases of classification of deposits which simply involve the referring of the subject back to verbal definitions in the books. The whole subject of the classification of mineral deposits, he states, to be one in which the interests of the miner have entirely overridden the reasonings of the chemists and geologists. "The miners," to use his language, "made the definition first. As used by miners, before being defined by any authority, the term lode simply meant that formation by which the miner could be led or guided. It is an alteration of the verb lead; and whatever the miner could follow, expecting to find ore, was his lode. Some formation within which he could find ore, and out of which he could not expect to find ore, was his lode." The term lodestar, guiding star, or north star, he adds, is of the same origin. Cinnabar is not found in any fissure of the earth's crust, or in any lode as defined by geologists, yet the Acts of Congress speak, as already seen, of lodes of quartz, or rock in place bearing cinnabar. Any definition of lode as there used, which did not embrace deposits of cinnabar, would be as defective as if it did not embrace deposits of gold or silver. The definition must apply to deposits of all the metals named, if it apply to a deposit of any one of them. Those Acts were not drawn by geologists or for geologists; they were not framed in the interests of science, and consequently with scientific accuracy in the use of terms. They were framed for the protection of miners in the claims which they had located and developed, and should receive such a construction as will carry out this purpose. The use of the terms *vein* and *lode* in connection with each other in the Act of 1866, and their use in connection with the term *ledge* in the Act of 1872, would seem to indicate that it was the object of the legislator to avoid any limitation in the application of the Acts, which a scientific definition of any one of these terms might impose.

It is difficult to give any definition of the term as understood and used in the Acts of Congress, which will not be subject to criticism. A fissure in the earth's crust—an opening in its rocks and strata made by some force of nature, in which the mineral is deposited, would seem to be essential to the definition of a lode in the judgment of geologists. But to the practical miner, the fissure and its walls are only of importance as indicating the boundaries within which he may look for and reasonably expect to find the ore he seeks. A continuous body of mineralized rock lying within any other well defined boundaries on the earth's surface and under it, would equally constitute in his eyes, a lode. We are of opinion therefore, that the term as used in the Acts of Congress is applicable to any zone or belt of mineralized rock lying within boundaries clearly separating it from the neighboring rock. It includes, to use the language cited by counsel, all deposits of mineral matter found through a mineralized zone or belt coming from the same source, impressed with the same forms, and appearing to have been created by the same processes.

Examining, now, with this definition in mind, the features of the zone which separate and distinguish it from the surrounding country, we experience little difficulty in determining its character. We find that it is contained within clearly defined limits, and that it bears unmistakable marks of originating, in all its parts, under the influence of the same creative forces. It is bounded on the south side, for its whole length, at least so far as explorations have been made, by a wall of quartzite of several hundred feet in thickness; and on its north side, for a like extent, by a belt of clay, or shale, ranging in thickness from less than an inch to seventy or eighty feet. At the east end of the zone, in the Jackson Mine, the quartzite and shale approach so closely as to be separated by a bare seam, less than an inch in width. From that point they diverge, until on the surface in the Eureka Mine, they are about 500 feet apart, and on the surface in the Richmond Mine, about 800 feet. The quartzite has a general dip to the north, at an angle of about 45 degrees, subject to some local variations, as the course changes. The clay or shale is more perpendicular, having a dip at an angle of about 80 degrees. At some depth under the surface, these two boundaries of the limestone, descending at their respective angles, may come together. In some of the levels worked, they are now only from two to three hundred feet apart.

The limestone found between these two limits—the wall of quartzite and the seam of clay or shale—has, at some period of the world's history, been subjected to some dynamic force of nature, by which it has been broken up, crushed, disintegrated, and fissured in all directions, so as to destroy, except in three or four places of a few feet each, so far as explorations show, all traces of stratification; thus specially fitting it, according to the testimony of the men of science, to whom we have listened, for the reception of the mineral which, in ages past, came up from the depths below in solution, and was deposited in it. Evidence that the whole mass of limestone has been, at some period, lifted up and moved along the quartzite, is found in the marks of attrition engraved on the rock. This broken, crushed and fissured condition pervades, to a greater or less extent, the whole body, showing that the same forces which operated upon a part, operated upon the whole, and at the same time. Wherever the quartzite is exposed, the marks of attrition appear. Below the quartzite no one has penetrated. Above the shale the rock has not been thus broken and crushed. Stratification exists there. If in some isolated places there is found evidence of disturbance, that disturbance has not been sufficient to affect the stratification. The broken, crushed and fissured condition of the limestone gives it a specific, individual character, by which it can be identified and separated from all other limestone in the vicinity.

In this zone of limestone numerous caves or chambers are found, further distinguishing it from the neighboring rock. The limestone being broken and crushed up as stated, the water from above readily penetrated into it, and operating as a solvent, formed these caves and chambers. No similar cavities are found in the

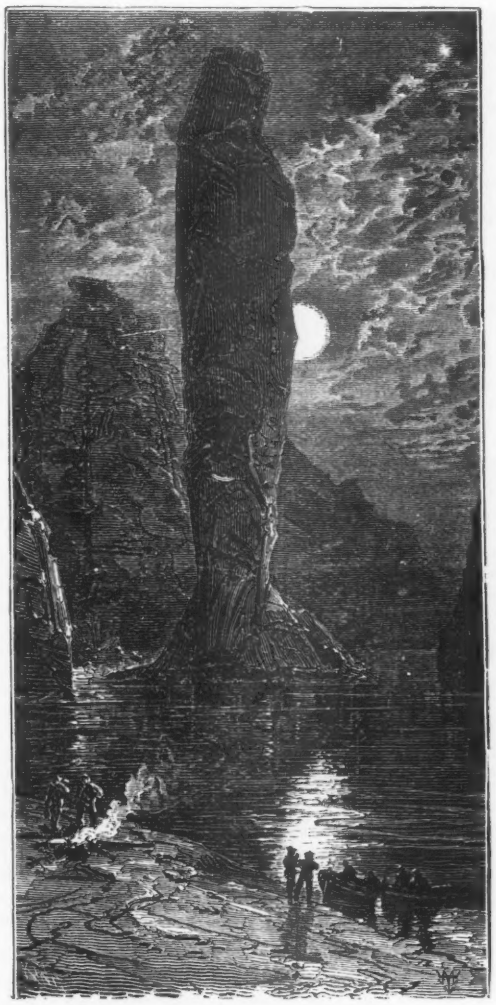

FIG. 24.—ISLAND MONUMENT IN GLEN CANON.—*See page 238.*

rock beyond the shale, its hard and unbroken character not permitting, or at least opposing such action from the water above.

Oxide of iron is also found in numerous places, throughout the zone, giving to the miner assurance that the metal he seeks is in its vicinity.

This broken, crushed, and fissured condition of the limestone, the presence of the oxides of iron, the caves or chambers we have mentioned, with the wall of quartzite and seam of clay bounding it, give to the zone, in the eyes of the practical miner, an individuality, a oneness, as complete as that which the most perfect lode in a geological sense ever possessed. Each of the characteristics named, though produced at a different period from the others, was undoubtedly caused by the same forces operating at the same time upon the whole body of the limestone.

Throughout this zone of limestone, as we have already stated, mineral is found in the numerous fissures of the rock. According to the opinions of all the scientific men who have been examined, this mineral was brought up in solution from the depths of the earth below, and would therefore naturally be very irregularly deposited in the fissures of the crushed matter, as these fissures are in every variety of form and size, and would also find its way in minute particles in the loose material of the rock. The evidence shows that it is sufficiently diffused to justify giving to the limestone the general designation of mineralized matter—metal-bearing rock. The three scientific experts produced by the plaintiff, Mr. Keyes, Mr. Raymond, and Mr. Hunt, all of them of large experience and extensive attainments, and two of them of national reputation, have given it as their opinion, after examining the ground, that the zone of limestone between the quartzite and the shale constitutes one vein or lode, in the sense in which those terms are used by miners. Mr. Keyes, who for years was superintendent of the mine of the plaintiff, concludes a minute description of the character and developments of the ground by stating that in his judgment, according to the customs of miners in this country and common sense, the whole of that space should be considered and accepted as a lead, lode, or ledge of metal-bearing rock in place.

Dr. Raymond, after giving a like extended account of the character of the ground, and his opinion as to the causes of its formation, and stating with great minuteness the observations he had made, concludes by announcing as his judgment, after carefully weighing all that he had seen, that the deposit between the quartzite and the shale is to be considered as a single vein in the sense in which the word is used by miners—that is, as a single ore deposit of identical origin, age, and character throughout.

Dr. Hunt, after stating the result of his examination of the ground and his theory as to the formation of the mine, gives his judgment as follows:

"My conclusion is this: that this whole mass of rock is impregnated with ore; that although the great mass of ore stretches for a long distance above horizontally and along an incline down the foot-wall, as I have traced it, from this deposit you can also trace the ore into a succession of great cavities or bonanzas lying irregularly across the limestone, and into smaller caverns or chasms of the same sort; and that the whole mass of the limestone is irregularly impregnated with the ore. I use the word impregnation in the sense that it has penetrated here and there; little patches and stains, ore-vugs, and caverns, and spaces of all sizes and all shapes, irregularly disseminated through the mass. . . . I conclude, therefore, that this great mass of ore is, in the proper sense of the word, a great lode, or a great vein, in the sense in which the word is used by miners; and that practically the only way of utilizing this deposit, is to treat the whole of it as one great ore-bearing lode or mass of rock."

This conclusion as to the zone constituting one lode of rock bearing metal, it is true, is not adopted by the men of science produced as witnesses by the defendant, the Richmond Company. These latter gentlemen, like the others, have had a large experience in the examination of mines, and some of them have acquired a national reputation for their scientific attainments. No one questions their learning or ability, or the sincerity with which they have expressed their convictions. They agree with the plaintiff's witnesses as to the existence of the mineralized zone of limestone with an underlying quartzite and an overlying shale; as to the broken and crushed condition of the limestone, and substantially as to the origin of the metal and its deposition in the rock. In nearly all other respects they disagree. In their judgment, the zone of limestone has no features of a lode. It has no continuous fissure, says Mr. King, to mark it as a lode. A lode, he adds, must have a foot-wall and a hanging-wall, and if it is broad, these must connect at both ends, and must connect downwards. Here there is no hanging-wall or foot-wall; the limestone only rests as a matter of stratigraphical fact on underlying quartzite and the shale overlies it. And distinguishing the structure at Ruby Hill from the Comstock lode, the same witness says that the one is a series of sedimentary beds laid down in the ocean and turned up; the other is a fissure extending between two rocks.

The other witnesses of the defendant, so far as they have expressed any opinion as to what constitutes a lode, have agreed with the views of Mr. King. It is impossible not to perceive that these gentlemen at all times carried in their minds the scientific definition of the term as given by geologists—that a lode is a fissure in the earth's crust filled with mineral matter—and disregarded the broader, though less scientific definition of the miner, who applies the term to all zones or belts of metal-bearing rock lying within clearly marked boundaries. For the reasons already stated, we are of opinion that the acts of Congress use the term in the sense in which miners understand it.

TO BE CONTINUED.

THE LIMIT OF THE CARBURATION OF IRON.

By M. Boussingault.

Translated from the *Comptes Rendus* of 1875, for the ENGINEERING AND MINING JOURNAL, by Chief Engineer Isherwood, United States Navy.

(Concluded from page 224.)

Every fact, then, leads to the belief that, in melted carbureted iron, the totality of the carbon is combined with the metal; and that during the lowering of the temperature a portion of this carbon becomes free. The consequence need not be drawn that iron carbureted to the maximum can only exist in the liquid state, since it is merely necessary for the solidification to be rapid to prevent the separation of graphite, in which case the solid metallic mass is homogeneous, and analogous by color, hardness, and fragility to white cast iron; all the carbon remaining combined with the iron as it was during fusion.

Such is not the case, however, when by slow cooling graphite appears. The solid metallic mass has now no longer a homogeneous constitution, but contains some carbon in combination, some carbon free, and very probably some pure iron, unless we admit with Karsten some polycarburets whose existence is very doubtful.

To corroborate these ideas on the nature of carbureted iron, experiments were instituted in the foundries of M. Holtzer at Unieux, on the combination of iron with carbon, for which purpose there was fortunately at disposal a Swedish iron free from manganese and nearly pure, having 0·9961 of metal.

I. In a crucible with damp charcoal (No. 2), 22 pounds of iron in fragments were placed, the intervals being carefully filled with wood charcoal.

II. In another crucible with damp charcoal (No. 1), 22 pounds of iron were arranged as in crucible No. 2.

These crucibles were then placed in a Siemens furnace; and a clean plate of cast iron with a raised edge, or curb, was prepared to receive the melted metal.

The pouring of crucible No. 2 took place after three hours and fifty minutes, the metal being very liquid. When solidified, it had a thickness of from 0·40 to 0·56 inch, and was divided into two nearly equal strata with well-marked separation: the lower stratum, tempered by contact with the cold cast iron plate, was white; the upper stratum had a deep gray tint and fine grain. At some places these two strata interpenetrated, and they had the appearance of mottled cast iron.

The pouring of crucible No. 1 took place after being nine hours and ten minutes in the furnace. The material after pouring had a thickness of from 0·5 to 0·6 inch, and was divided into two perfectly defined parts: the lower part or stratum, tempered, being white, and about one-third of the thickness of the upper part or stratum, which was grained and of a deep gray color.

The carbureted iron (No. 1) had the following composition:

	Iron.	Combined Carbon.	Graphite.	Total Carbon.
In the mass	95·90	2·10	2·00	4·10
In the white strata	95·99	3·585	0·425	4·01
In the gray strata	95·22	2·67	2·11	4·78

It thus appears from the experiments in the foundries at Unieux that no part of the iron carbureted to the maximum was free of graphite: the least was found in the white tempered stratum of No. 1, which gave 0·004. Supposing this feeble quantity to be combined with the metal, the white stratum would have nearly the theoretical composition Fe_5C; that is, one equivalent of carbon combined with five equivalents of iron. The carbureted iron (No. 1), poured at a more intense temperature, had exactly the composition Fe_5C =

Iron	95·90
Carbon	4·10
	100·00

—notwithstanding that only a moiety of the carbon was combined and the other moiety, graphite, was free. There can be no doubt that, in melted carbureted iron, the totality of the carbon is united with the totality of the iron; and that the dissociation of a part of the composition Fe_5C begins during the lowering of the temperature.

The reason why the solid, white, tempered stratum (No. 1) preserved the composition Fe_5C which it had in the liquid state is because of the suddenness with which it was liquefied; whereby the molecules of graphite were not allowed time enough to aggregate by virtue of the affinity which draws them together as the metallic mass approaches the pasty consistence.

The dissociation indicated by the appearance of graphite has taken place in all carbureted iron where this kind of carbon is found; and as there cannot be in the cold metal one equivalent of free carbon without there being at the same time five equivalents of free iron, the result is that the metallic mass after solidification is a mixture of carbureted iron Fe_5C, of graphite, and of pure iron. It would accord but little with nature to suppose that the mass in which the graphite is disseminated was formed of one or several polycarburets; better would it be to suppose iron and carbon combinable in all proportions, which would be not only without precedent in chemistry, but still more singular in presence of the fact, established by my experiments, that iron, whatever may be the intensity of the temperature, takes but a limited quantity of carbon. Thus, this metal, which is sometimes united to only 0·0001 or less of this combustible, cannot take more than from 0·04 to 0·05 of it. However, whatever may be the probability of the existence of the compound Fe_5C, it can only be definitively accepted after it has been isolated.

Nothing is more curious than these changes in the nature of carbureted iron caused by changes of temperature: gray cast iron transformed into white cast iron by the union of free carbon with free iron; and, reciprocally, white cast iron metamorphosed into gray cast iron by the liberation of carbon and iron.

As opportunities for observing the transformation of white cast iron into gray cast iron are not frequent at foundries, I believe I have performed a useful act by instituting an experiment at Jacob Holtzer's works on a large quantity of metal, conducted in a manner to render the cooling the slowest possible.

At four o'clock in the evening two crucibles, each containing 33 pounds of the white lamellar cast iron of Ria, were placed in a Siemens furnace used for the melting of steel, and at seven o'clock they were taken out and properly covered. The cooling was sufficiently slow, as thirty-six hours after the covering the crucibles were still at an obscure cherry-red heat: the entire time of cooling was fifty hours. When these crucibles were broken open, there was found in each a very homogeneous mass, surmounted by a yellowish green slag 1⅜ inches thick. The two masses when broken under the pile-hammer presented all the appearances of a gray and grained cast iron, somewhat malleable, and of great tenacity. The following are the results of the analyses:

	White Cast Iron.	Gray Cast Iron.
Combined carbon	3·800	0·660
Graphite	0·000	2·782
Silicium	0·000	0·660
Sulphur	0·100	0·020
Phosphorus	0·075	0·080

	White Cast Iron.	Gray Cast Iron.
Manganese	2·585	1·750
Iron	92·935	93·945
	99·915	99·897

A comparison of the results shows the quantity of phosphorus to be the same in the two kinds of cast iron. The gray contains only one-fifth of the sulphur in the white. There is less carbon and more silicium in the gray iron. Most remarkable is the disappearance of more than one-third of the manganese during the transformation of the white cast iron into the gray, which fact appeared so singular that several analyses were considered necessary for its verification. A natural supposition is that the missing manganese passed into the green slag formed on the surface of the cast iron during its fusion. Analyses of the iron before and after its transformation into gray cast iron gave:

	Carbon.	Silicium.
White cast-iron	3·800	0·420
Gray cast-iron	3·442	0·660
Difference	−0·358	+0·240

In the gray-cast iron 0·004 would have been replaced by the 2½ thousandths of silicium certainly derived from the crucible or from the slag disseminated in the iron of the first pouring, silex at a high temperature in presence of iron becoming in fact a burner of carbon.

These researches on carburation furnish new proof that in cementation the carbon imbibed comes from the fixed carbon of the wood charcoal. The possibility of the union of the two solid bodies, iron and carbon, in contact at a high temperature, has never been in doubt since the memorable experiment of Clouet, so elegantly reproduced by M. Marguerritte, in which iron is changed into steel by combination with diamond, a decisive experiment, in my opinion—for Clouet obtained cast steel—that the fusion of a carbureted iron is always preceded by a penetration of carbon into the solid metal. It is in this manner that platinum, and, as I have recently established, iridium and palladium, mixed

at a red heat in a crucible with damp charcoal able to furnish silicium, are at first cemented by this metalloid before yielding by a sufficiently high temperature regular fused silicates.*

This is precisely what occurs when iron is heated in powdered diamond, graphite and sugar charcoal, and in strongly calcined soot. Here, likewise, carburation precedes fusion, and takes place under these conditions without the mingling of gaseous combustibles.

CLASSIFICATION OF COALS.*

By Prof. Persifor Frazer, Jr., Philadelphia.

(*Continued from page 225.*)

The true method to be pursued in obtaining comparative data for coals is indicated by Prof. Walter R. Johnson in his unrivaled report on *American Coals* to the United States Government, in 1844, and consists in giving the ratio of volatile to fixed combustible matter.

CUMBERLAND COALS.

I. New York & Maryland Mining Co.
II. John Neff's, near Frostburg, above Cumberland.
III. William Easby, "coal in store," near Cumberland, Md.
IV. Easby & Smith, coal in store mine.
V. Atkinson & Templeman, Dan's Mt.
VI. Cumberland (for Navy Yard use).

PENNSYLVANIA COALS.

VII. Dauphin and Susquehanna.
VIII. Blossburg.
IX. Lycoming County (near Ralston).
X. Quin's Run.
XI. Karthaus.
XII. Cambria County, ten miles from Hollidaysburg.

A synoptical table containing the analyses, specific gravity, etc. of the above coals is printed p. 304 of Prof. Johnson's *Report*, as summing up the information obtained in regard to this class of coals.

The ratios of volatile to fixed combustible matter (*i. e.* the quotient obtained by dividing the percentage of the former into that of the latter) here follows :

	I.	II.	III.	IV.	V.	VI.
Cumberland Coals.....	5·971	5·880	5·089	4·786	4·937	5·000
	VII.	VIII.	IX.	X.	XI.	XII.
Pennsylvania Coals.....	5·374	4·946	5·181	4·046	4·110	3·656

Professor Rogers in his essay on the "Classification of Coals," vol. ii., part 2, p. 989, appears in one sentence to recognize the importance of this ratio, though he nowhere makes it an essential factor of his system, unless it be in a table which will be considered shortly. He remarks :

"The distinctive properties of the different kinds of coal are determined mainly, though not altogether, by the relative proportions of solid carbon and volatile matter which they severally contain."

Also : "The essential difference between the bituminous coals and the anthracites is, not that the latter contain no gases or volatile matter, for they sometimes possess as much as 9 or 10 per cent., but that they are destitute of those chemical compounds of the gases and the carbon known as bitumen."

On referring to the analyses of the coals whose ratio of combustibles is thus given, it will be acknowledged that the uniformity of these results is satisfactory, considering that the percentage of fixed carbon varies between 68·438 and 76·688 ; the volatile substances between 12·309 and 19·019 ; and the ash between 7 000 and 13·961.

And as to minor differences, be it observed that the necessary connection of these beds with each other has not been made out by Professor Johnson, who only associates them together for temporary convenience.

It is not always easy to simplify the method of stating this ratio to the form adopted in Professor Johnson's table as above, for to be applicable it must include all kinds of coals, including the "Hydrogenous or Gas Coals," whose percentage of volatile is greater than that of fixed combustible matter. In this case a single number, viz. the quotient of $\frac{C}{\text{Vol. H-C.}}$, would be a fraction, and this is to be avoided if possible. Of course where the water is also considered the plan of expressing the ratio by a single number is impossible.

Such ratios introduced into the discussions of the natural fuels have the same right of existence, and would fill very nearly the same role in such discussions, that the silica, protoxide, and sesquioxide ratios do in the analytical formulæ of minerals. It would be too much to say that either method would permit of a rigid division into classes, since there are transition forms which always will prevent such absolute divisions of natural objects ; but these cases will form a small portion of the whole number, and the handling of the rest will be much simplified.

In the tables constructed with due regard to the above consideration, the first number indicates the percentage amount of fixed carbon in the proportion. The next number refers to the volatile combustible matter. Here the analogy ceases in most cases, since we have determined above to regard the coal as essentially a mixture of gas, carbon, and impurity, under which latter term we include water, ash, sulphur, phosphorus, and whatever is not a necessary factor of the fuel ; whether held in the fossil fibre of the coal plant or separated by ignition ; whether oxidized or volatilized.

A few considerations regarding these impurities will be found further on.

To repeat: In most cases the analogy between the oxygen ratio of minerals and the combustible ratio of the fuels will cease at the second term, or as if there were simply the oxygen of the electro-negative to be compared with that of the electro-positive elements. But just as in this latter case it is found most convenient to separate the electro-positive elements by their quantivalences, or *valences*, and thus to make a proportion of several terms ; so it will be found best to add a third term to those expressing the fixed and gaseous combustibles for the purpose of eliminating an error which is likely to occur in estimating the hygroscopic moisture.

All those who have had any experience in the analysis of coals are aware that no operation during the analysis requires so much care as the water determination.

From amidst the mass of testimony from numerous chemists on this subject, I select that of Prof. Wormley, in the reports of the Ohio Geological Survey, who states that a given sample of coal loses less in weight when raised to 240° than at 212°. Mr. A. S. McCreath, the chemist of the present Geological Survey of Pennsylvania, in alluding, in his description of methods, to this observation (*Report M., Second Geological Survey of Pennsylvania*, 1874-75, p. 28), adds that "this was not found to be the case with the coals" he "examined from this State, for in every instance was the loss greater *when the coal was dried at* 225° *than at* 212°."

It follows, however, from these observations that the less loss must amount to an increase of weight through oxidation, accompanied very often, also, by an actual disengagement of volatile hydrocarbons by distillation at even these low temperatures. (See remark of Varrentrapp, quoted from Rothwell, by McCreath, p. 33.) So that the resultant will be the sum of a number of positive and negative quantities, depending upon the character of the coal, and the ease with which its composition is changed by heat. That the actual constitution of the coals is thus changed to a greater or less extent seems undoubted.

If, now, part of the volatile substances which should have been reckoned to the combustible hydrocarbons have been expelled with the moisture, the gas-carbon ratio will be affected by it, and, in cases where the known character of the fuel permits a close approximation to the true amount of its moisture, this correction should be made in the form of a third term to the proportion. When this appears without other explanation, it is understood to refer to the moisture; thus, C : V. H-C. : W = Fixed carbon : volatile hydrocarbons : water.

It is unfortunate that in the coal analyses cited by Prof. Rogers, including those of Prof. Johnson, no attempt has been made to separate the moisture from the volatile hydrocarbons, all being considered alike volatile matter. This fact vitiates any classification which may be based on such analyses.

A list of sixteen analyses of "hard dry anthracites" from Rogers's final Report, vol. ii., part 2, pp. 969, 970, is given in the following table, together with two extra columns showing the percentage of fixed carbon and volatile matter, calculated according to the principles stated above.

TABLE I.—HARD DRY ANTHRACITES.

	Rogers's Analyses.			Total.	Percentage of Constituents of Fuel.		
	Fixed Carbon.	Volatile Matter.	Ash, Water, and Impurities		Fixed Carbon.	Volatile Combustible Matter.	C / V. H-C.
1 Rhode Island.....	77·00	3·00	20·00	100	96·25	3·75	25·66
2 Nesquehoning, 10-foot vein..	86·60	6·40	7·00	100	93·11	6·89	13·51
3 Summit Mines of Lehigh Co.	88·50	7·50	4·00	100	92·19	7·81	11·80
4 " "	87·70	6·00	5·70	100	93·00	7·00	13·28
5 Tamaqua Coal D, East.....	92·07	5·03	2·90	100	94·82	5·18	18·30
6 Tamaqua Coal E, East.....	89·20	4·54	6·26	100	96·10	3·90	24·64
7 Tamaqua Coal R, Sharp Mt..	87·45	7·55	5·00	100	92·05	7·95	11·57
8 Tuscarora.....	88·20	7·30	4·30	100	91·38	8·62	10·60
9 Beaver Meadow.....	90·20	2·52	7·28	100	97·28	2·72	35·76
10 Schenoweth Bed, E. Norweg'n	94·10	1·40	4·50	100	98·53	1·47	67·02
11 Third Coal, Nealy's Tunnel, near Pottsville.....	89·20	5·40	5·40	100	94·29	5·71	16·51
12 Forest Improvement.....	90·70	3·07	6·23	100	96·72	3·28	29·48
13 Sharp Mt. N. of Pine Grove..	80·57	7·15	12·28	100	91·85	8·15	11·27
14 Lykens Valley.....	83·84	6·88	9·28	100	92·41	7·59	12·17
15 Shamokin	89·90	6·10	4·00	100	93·64	6·36	14·71
16 Black Spring Gap.....	82·47	9·53	8·00	100	89·63	10·37	8·64

No. 1 was analyzed by Hayes ; Nos. 2, 3, 4, 5, 6, 7, 8, and 13, by the First Geological Survey of Pennsylvania; Nos. 9, 10, 11, 12, 14, 15, and 16, by Prof. W. R. Johnson.

A similar table, with similar added columns of the semi-anthracites from the same source, here follows :

TABLE II.—SEMI-ANTHRACITES.

	Rogers's Analyses.			Total	Percentage of Constituents of Fuel.		
	Fixed Carbon.	Volatile Matter.	Ash, Water, and Impurities		Fixed Carbon.	Volatile Combustible Matter.	C / V. H-C.
1 Black Spring Gap, Lea Vein..	88·84	8·96	2·20	100	90·83	9·17	9·90
2 " Gray Vein.	81·62	9·78	8·60	100	89·30	10·70	8·35
3 Lykens Valley, Third Bed....	88·25	8·85	2·90	100	90·83	9·17	9·60
4 Zerbe's Run.....	84·25	7 31	8·44	100	92·01	7·99	11·51
5 Wilkes-Barre, Warden's Bed	88·90	7·68	96·58	100	92·04	7·96	11·56
6 Carbondale.....	90·23	7·07	2·70	100	92·73	7·27	12·75
7 Black Spring Gap, gray band of Gray Vein.....	81·40	11·40	7·20	100	87·72	12·28	7·14
8 Gold Mine Gap, Peacock Vein.	82·15	10·95	6·80	100	88·23	11·77	7·49
9 " Heister Vein..	81·47	10·43	8·10	100	88·65	11·35	7·81
10 Rausch Gap, Dauphin, Peacock Vein.....	77·23	10·57	12·10	100	87·96	12·04	7·30
11 Yellow Spring Gap.	79·55	10·95	9·50	100	87.90	12·10	7·26
12 Rattling Run, Dauphin.....	74·55	13·75	83·30	100	84·42	15·58	5 41

Nos. 1 and 2 analyzed by Prof. W. R. Johnson; Nos. 3, 5, 6, 7, 8, 9, 10, 11, 12, First Geological Survey of Pennsylvania; No. 4, Hayes (mean of 5 analyses).

TO BE CONTINUED.

THE UTAH MINING DISTRICTS.—VI.

(Special Correspondence from our Western Office.)

BINGHAM.

The mining outlook in this camp is at present writing not very encouraging. To any one at all acquainted with the state of the ore market, occasioned by the unprecedented low price of lead, this circumstance will not be a surprise ; neither does it reflect upon the intrinsic value of the camp as a mining district, for it is generally conceded to be one of the finest, if not the finest, in the Territory. In fact, I think Bingham produces as much ore as any two other districts in Utah. The great bulk of the ore, however, is low grade—*i. e.*, only 20 per cent. lead and some 15 oz. silver—which cannot be shipped with lead at 4⅞ cents in New York, and the smelters here only offering to buy on a standard of 40 per cent.

Almost all of the mines contain some high grade ore—*i. e.*, from 40 per cent. to 60 per cent. lead and 20 to 70 oz. silver—along with the large bodies of low grade. The former is sorted out and shipped in spite of the low market. In the case of the Spanish mine, which contains very little high grade ore, the ore is sent out of the mine in bulk and concentrated up to a shipping standard ; and there are such masses of it in the mine that it pays well to do this. The average cost of transportation from the dump to Salt Lake is $4.50 per ton, although in the case of the *Old Telegraph* the rate is considerably less, on account of its favorable location to the tramroad and the particularly advantageous means of handling the ore in the mine.

Were not the mines of Bingham particularly good ones, they would not have been able to stand the pressure of the last six months as well as they have. Outsiders are very apt to obtain their impressions of Utah mines through hearing of the non-dividend-paying *Emma*, the *Flagstaff*, the *Last Chance*, etc. When told that these mines are but examples of the most flagrant bad management and

* Iridium prepared by M. H. Sainte-Claire Deville gave by fusion in a crucible with damp charcoal a very regular spherical lump at the bottom ; the weight of the metal had increased 0·07.

† A paper read before the American Institute of Mining Engineers, at the Wilkes-Barre meeting, May, 1877.

"crookedness," they say, "Oh! yes; you always cry bad management." But how is it that the managers, the gentlemen who were put in charge to run the mines, handle the ores, and receive the returns, are so wealthy? And how is it that the *Flagstaff*, under the able management of the present lessees, is to-day one of the best mines on the Pacific Coast? The Bank of California could not long stand under a cashier who never made any returns of the moneys he took in, and who would run it into debt in spite of its millions.

Bingham is some twenty-six miles from Salt Lake City by wagon road, and thirty-one miles by rail, in a southwesterly direction, in the Oquirrh or West Mountain Range, and is very easy of access, being only some 6,000 feet above sea level. The highest mines are not over eight miles from the mouth of the cañon, where it debouches on to the plains of the great Salt Lake Valley. The railroad depot is one and a half miles below town, and from there a horse tramroad is built up as far as the *Old Telegraph* mine in Bear Gulch, and the *Spanish* mine in Bingham Cañon, altogether some two and a half miles above town. This tramroad is used exclusively for the transportation of ore and supplies, and has a very steep grade in places. The cost of running the loaded cars down to the steam track is merely nominal.

The town proper is strung through the narrow gorge for a mile or so, the houses being all of wood and of the same style of architecture as obtains in Alta, described previously. It boasts of two justices of the peace and two constables. King Faro holds court *ad libitum*, however, but the citizens are an orderly, peaceful class of men, and the constables have rather an easy time of it.

The district polled some 600 votes at the last election held this month, and it is estimated the population will number from 1,200 to 1,500 souls, almost exclusively Gentiles. The cost of living is not at all excessive, the most expensive necessity, comparatively speaking, being fuel. Wood is delivered in town for $9 a cord, and as $3 is the charge for cutting it up, $12 may be named as the net price before it is ready for the stove. Coal costs $16 a ton delivered, and, strange to say, is cheaper by $1 per ton when brought from Salt Lake by team than by rail. Very little timber is left on the hills in the immediate vicinity of Bingham, it all being brought a distance of four to five miles from the cañons across the range. Wood for mining timbers is thus an item of considerable expense to owners who work their mines legitimately with a view of going deep. Timbers cost from $14 to $16 a cord.

It is deplorable how some of the most promising mines in their upper workings have been allowed to go to ruin through the indifference of owners or the negligence of leasers. Some of them have caved so that excellent bodies of ore cannot be reached without great danger. Latterly mine owners appear to have come to a sense of the importance of this branch of mining, and the best mines are now carefully propped up, some of them in an almost extravagant manner.

One of the difficulties that a reporter has to contend with in Utah is a disposition on the part of mine owners and leasers to keep the condition of their properties a secret. This is perhaps well enough in a business way, but when it comes to reading reports, the same owners, etc., are very ready to condemn the reporter or the journal if the information given is not "strictly reliable." No reporter of a respectable journal has any desire to pry into the *private* business affairs of any gentleman or mine, but matters that are of public interest, and which more or less reflect on the credit or otherwise of a community, should be given to a reporter, so that he may not obtain a wrong impression as to the real state of affairs.

When leasers refuse entrance to their mines, one is apt to conclude that either they are in splendid pay and do not care to have the owners know it, or that they are in no pay, or that they are working the mine in such a miserable manner that they are ashamed to show it; and where owners refuse an entrance, the impression is often given that something is wrong: either the mine is not what it professes to be and some jobbing operation is going on, or it is not worked properly; or, having struck a lean place, they are afraid the reporter will speak unfavorably of the property.

Now, the presumption is that a journal of standing and reputation will at least send a man of ordinary common sense to report for it, who knows enough not to condemn a property because there happens to be no considerable amount of ore in sight at the particular time he may call. Handlers of mining property ought to know by this time that would-be investors will not be deceived by favorable reports only.

The number of mines at work here is considerable, in spite of the outlook, although the largest are employing not more than half force, and in some cases doing this more to fill contracts than because it pays well.

The Bingham hills are not very rugged, though steep in places, and most of the mines are quite accessible by wagon road, conditions which naturally facilitate the shipping of ore in no small measure. The mines are mostly quite dry so far as developed.

As the geology of the country has been described in former issues of the JOURNAL, I will merely say that the largest ore bodies thus far found lie between quartzite walls, and give every indication of being bed-veins. The general strike seems to be northwest and southeast, while the dip of the large veins does not vary much from 30° or 40°. In these the ore is found in chambers, pockets, or bunches, dispersed irregularly through a gangue or vein matter of brecciated lime and quartz rock, usually quite soft and easily broken with the pick, the width between walls varying from three to forty, and even fifty feet.

The ore seems to lie principally on foot-walls. Near the surface it is apt to be richer in silver and gold, with a small percentage of lead, the mass being soft and much decomposed, while lower down the order is reversed, the percentage of lead increasing and the silver decreasing, the ore being still much decomposed, very soft and easily broken, and occurring principally as carbonate of lead, together with masses of galena, which latter carries a little more silver than the carbonate, while lower down, as far as explored, at or below water level, galena is found much mixed with iron pyrites, and carrying but a small quantity of the precious metals.

High grade ore (explained above) occurs in conjunction with the low grade, and in some cases the bodies or pockets of these are simply *immense*, being in both the *Old Telegraph* and *Revere* in places forty feet thick, and continuous, so that thousands and thousands of tons are "in sight." The same occurred in the *Winnamuck* and *Jordan*; since closed down, the former on account of the low prices paid for ore, the latter because it closed itself down by caving in.

In the same belt are found veins in granite, and with a granite foot-wall and a porphyry hanging wall. These are more vertical, and partake of the nature of true fissures, having a regular clay gangue, and in places well-defined smooth walls. The percentage of precious metals is also larger in these lodes, while the ore bodies are not so large, though often containing fully as high, if not a higher, percentage of lead, especially where found as galena. Near the surface they are often especially rich in silver and gold.

A summary of what is going on at the principal mines will doubtless prove of interest, and will appear in our next.

COMBUSTION TEMPERATURES.*

By M. Berthelot.

The formula generally used to calculate the temperature of combustion is $t = \frac{Q}{C}$, in which Q is the quantity of heat, and C the product of the specific heat of the products of combustion into their weight. M. H. Sainte-Claire Deville has shown that only a portion of a given weight enters into combustion, the remainder being prevented from doing so, owing to the temperature developed tending to cause dissociation. If k denote the portion combining, and C_1 the mean specific heat between 0° and t°, then

$$t = k\frac{Q}{C_1} \quad \ldots\ldots(1)$$

in which Q is the only constant, and the equation is indeterminate.

A second relation is obtainable, however, through the experiments of M. Bunsen, who burnt a combustible mixture at constant volume, and measured the resulting pressure, P. If g be the theoretical condensation, or ratio of the volume of the gas produced by combustion to the original volume, both reduced to the same temperature, then

$$P = P_0 (1 - k + k g)(1 + a t) \quad \ldots\ldots(2)$$

If a be the mean specific heat at constant volume of the original gases, and b that of the products of combustion, there follows

$$C_1 = (1 - k) a + k b \quad \ldots\ldots(3)$$

whence 1 and 2 become

$$t = \frac{k Q}{(1 - k) a + k b} \quad \ldots\ldots(4)$$

$$\frac{P}{P_0} = (1 - k + k g)\left[1 + \frac{a k Q}{(1 - k) a + k b}\right] \quad \ldots\ldots(5)$$

In order to solve these equations (3, 4, 5), M. Bunsen assumed the two specific heats, a and b, to be constant, and independent of the temperature and pressure: and k and t are given by two equations of the second degree. M. Bunsen's table of experiments and deductions is appended, on reference to which it will be found that k increases from 0·319 to 0·547, according as the presence of inert gas lowers the temperature of combustion.

Regnault's and Wiedemann's experiments made on simple gases, and on carbonic oxide which is formed without condensation, proved that, in these cases, the specific heat between 0° and 200° C. is constant; whilst their experiments on gases formed with condensation show that the specific heat varies, the mean being given in the following empirical formulæ:

For CO_2 = 44 gr. C. = $8{\cdot}41 + 0{\cdot}0053\ t$) ..Mean of Regnault and Wiedemann.
" NO = 44 " = $8{\cdot}96 + 0{\cdot}0028\ t$)
" C_2S_4 = 76 " = $10{\cdot}62 + 0{\cdot}007\ t$ .....Regnault.
" NH_3 = 17 " = $8{\cdot}51 + 0{\cdot}00265\ t$ .....Wiedemann.
" C_4H_4 = 28 " = $9{\cdot}42 + 0{\cdot}0115\ t$ ..... "

The specific heat at constant volume has not been measured at different temperatures, but may be obtained approximately, for gases following the law of Mariotte and Gay-Lussac, by considering the difference between the specific heat at constant pressure and at constant volume as equivalent to the external work of expansion, or 1·93; hence

For CO_2 ..... $C_1 = 6{\cdot}48 + 0{\cdot}0053\ t$.

If the temperature of combustion of carbonic oxide and oxygen be now calculated, at constant pressure, assuming Q = 69,000, then

$$t = \frac{69{,}000}{8{\cdot}41 + 0{\cdot}0053\ t} = 2{,}900°;$$

whilst at constant volume,

$$t' = \frac{69{,}000}{6{\cdot}48 + 0{\cdot}0053\ t} = 3{,}060°.$$

If the specific heat were constant, these temperatures would be respectively 7,200° and 8,300°. There is a hypothesis involved in the assumption of the specific heat of carbonic acid, varying between 0° and 3,000°, as it does between 0° and 200°; and in reality the pressures deduced are one-fifth less than those obtained experimentally by M. Bunsen; but a slight dissociation would cause this difference and make these quantities agree.

The experiments of M. Bunsen, if exact, furnish means to calculate (without any hypothesis as to the variation or constancy of specific heat) the limits of temperature between which combustion is necessarily comprised. If the law of Mariotte and Gay-Lussac is considered to hold at high temperature, then, from equation 2,

$$t = \left\{\frac{P}{P_0}\frac{1}{1 - k + k g} - 1\right\} 273 \quad \ldots\ldots(6)$$

Eor a mixture of gases in equivalent proportion, k varies from 0 to 1; and for a mixture containing 1-m volumes of inert gas between 0 and m, and putting these values of k in equation 6, the maximum and minimum limits of temperature of combustion, t_1, t_2, are obtained. These are placed in the following table, which also contains the values calculated by Bunsen:

Combustible Mixture, in volumes.	Bunsen.			Berthelot.	
	$\frac{P}{P_0}$ Experiment.	k. Calculation.	t. Calculation.	t_1. Calculation.	t_2. Calculation.
1. ⅔ CO + ⅓ O	10·78	0·351	3,172	4,140	2,612
2. "	10·19	0·319	2,893	3.900	2,537
3. " + 0·1079 O.	9·05	0·314	2,558	3.066	2,198
4. " + 0·6857 O.	8·89	0·460	2,471	2,760	2,154
5. " + 0·8554 O.	8·44	0·478	2,325	2,537	2.031
6. " + 1·0861 O.	7·86	0·490	2,117	2,280	1,875
7. " + 1·2563 N (air)	7·73	0·515	2,084	2.203	1,838
8. " + "	7.35	0·470	1,909	2,083	1,734
9. " + 1·7145 O	6·67	0·520	1,726	1,875	1,548
10. " + 2·1559 O.	5·83	0·512	1,460	1,505	1,319
11. " + 3·1629 O.	4·79	0·527	1,146	1,150	1,034
12. ⅔ H + ⅓ O	9·97	0·338	2,854	3,809	2,449
13. "	9·75	0·336	2,833	3,718	2,389
14. " + 1·2599 N (air)	7·49	0·547	2,024	2,126	1,715

The temperature obtained by the combustion of hydrogen and oxygen in air may be considered low when compared with the temperature of fusion of platinum, which has been computed at 2,000°; but in this calculation the specific

* Abstract of paper in *Comptes Rendus*, from the Minutes and Proceedings of the Institution of Civil Engineers, of London, edited by James Forrest, Secretary.

heat of platinum has been supposed constant, whilst, if the rate of variation obtained by Dulong be employed, this temperature would be only 1,400°; the real temperature is probably between these limits.

The author concludes by remarking that, in experiments 7 to 11, there is only a difference of 10 per cent. between the values t and t' of the table, this amount being reduced to 45° in 10, and 4° in 11, caused by the difference between $k = 1$ and $k = 0{\cdot}5$; these differences are too near to the limit of experimental error to allow of any simple law being formed; but the experiments, even if they give no absolute data as to the nature, degree, or existence of dissociation, appear to establish the possibility of obtaining temperatures near to 3,000°.

MINING NEWS.

Staff Correspondence of the Engineering and Mining Journal.

ARIZONA.

From our exchanges we condense the following:

"I. N. Cohun lately shipped 55,000 lb. pig copper, via El Moro to Baltimore, and have still in store 47,200 lb. The Longfellow and Thompson are the only mines worked at present, and the companies working them only run one thirty-inch furnace each. Notwithstanding the limited capacity, they will turn out 3,000.000 lb. of pig copper annually.

"The Clifton ores are entirely free from base metals, no antimony or arsenic are contained in them, and, as a natural consequence, the copper brings a higher price in market than almost any other offered for sale. These ores average from 20 to 30 per cent. copper, and are very easily mined and smelted. Sweeny & Gleason's furnace has lately been fired up, and there is no reason why it should not duplicate the yield of the Lesinsky furnace."—*Grant County Herald,*

COLORADO.

Our San Juan correspondent writes as follows: The weather for the past few days has been wintry, snow having fallen to a depth of 1 to 3 inches here in the valley, and varies from that depth here to 12 inches on the summits of the mountains. This is usually the manner in which the rainy season ends, and miners and mill men are feeling jubilant at the prospect of good weather.

Much more work has been done this year than in any one that has passed. The miners, as a class, are settling down to the firm belief that "prospect holes" are not mines. Many are too poor to do much work at present, but all, or most of them, are starting works in shape of drifts or tunnels that will take from one to five years for their completion. With supplies of all kinds much cheaper, and better prices for ore than the most sanguine could have expected, we are beginning to feel that the future of San Juan is assured. The works at this place are moving along slowly but surely. Most of the machinery is now on the ground, and is all to be delivered within 30 days. The works are to have a capacity of 15 tons per day. The Lixiviation Works at the forks of Cement, seven miles distant, are being pushed to completion as rapidly as men and money can do it.

The works of the Animas Forks Mining Company (concentrator) are to be started next week.

The works of the Philadelphia Company, started about ten days ago, are running very successfully on ores running from 40 oz. up to 100 oz.

The works of the Millville Mining Company (Lightning Amalgamator, Walker's patent) started up some time ago for a trial run, but by the breaking of a cog-wheel were compelled to stop. Will be running again in a few days.

The smelting works of G. Greene & Co. are still in full blast, and are sending out from three to four tons of base bullion every 24 hours. They have been very successful this summer, and have given proof positive that the mineral is *here*.

In mining matters there is nothing of much importance outside of the usual routine. In this immediate vicinity ore is being shipped from but few mines, the Tom Moore, Byron, and Boomerang mines being the principal ones. The former two are shipping to the Oceam Wave smelter, Lake City, and the latter to Crooks's.

The Mountain Green has been leased to parties who will work it through the winter.

A tunnel is being run to cut the Yellow Jacket Mine. Work will be continued throughout the winter.

Numerous sales are reported, but the consideration in most cases is small.

In my next I will give you, so far as able, the most important works in progress, and those that will be continued during the winter.

COLORADO—BOULDER COUNTY.

"The Monitor Mine at Caribou is to be timbered up and sunk another 100 feet. About 100 men are employed on a large mill that is going up on the Washington Avenue Mine. The dump of the Slide Mine is to be sorted, and the bulk of it milled at once. At Cardinal the Trojan Mine is working twenty-five men. The ore is to be concentrated by Frue belts in the Nederland Company's mill.

"The Smuggler Mine at Balaret is now running a force of 55 men. Ten sacks of ore recently shipped from this mine netted $1,500."—*Sunshine Courier.*

"Carvell's mill on Boulder Creek was burned lately. It was nearly new and very complete in all its appointments. The property was partially insured."—*Boulder County News.*

"THE MELVINA MINE.—Henry Neikirk sold twenty tons of ore of the Boston and Colorado Smelting Company this week for $4,960. The assay value was somewhat greater. This ore was the result of ninemen's work for forty days in the Melvina mine of Boulder County. The cost of getting out what will yield over $5,000 was about $1,500.

"The above handsome return was mainly obtained in developing drifts and shafts. The main part of the stoping ground is left standing in the mine. Five men are employed in sinking, etc., and four in stoping. The mine is 260 feet deep, and has paid the largest proportionate profits, since its first opening in July, 1875, of any mine we have ever heard of.

"Some of the time 80 per cent. of the receipts were profits. The above expense includes mining and transportation to the smelting works. There are no signs of the splendid ore body giving out. Small quantities of the ore yield at the rate of thousands of dollars per ton, but much of it goes a few hundred. A portion of it is poorer, so that concentration is necessary, which is done by the Frue vanner.

"The Bobtail, Gregory, Gunnell, Kansas, Kent County, and Comstock produce altogether about 275 tons of ore daily.

"The Pyrenees is doing as well as ever. The machinery over the California will soon be ready for work. The water is nearly out of the Mackie, and entirely out of the Alps shaft.

"John Kruse & Co. sold 1½ tons of ore from the Omaha mine recently for $227 per ton. Over one-half of the value was silver."—*Central City Register.*

IDAHO.

"There has been much excitement in town the past few days relative to the rich discoveries in the Black Jack veins on Florida Mountain. The ledge is the heaviest and richest that has been discovered in this country since the palmy days of the Poorman. It is a true fissure, and has all the characteristics of an immense and permanent ore body. Plenty of rock has been taken out that yields a dollar to the pound.

"Recent developments in the Belle Peck point with unerring certainty to a rich bonanza in the lower levels of the Poorman. At the bottom of the winze sunk at the south end of the main chimney in the Belle Peck the ledge wears a most promising appearance. The pay streak is from ten to fifteen inches wide, and is increasing as the work goes on. It is unusually rich in free gold, and is the best prospect found in this mine for a long time.

"The Potosi is yielding several tons of good rock daily. The crushing at Scawood's mill will be completed next week, and favorable results are anticipated. At the Golden Chariot sinking is going forward rapidly, and in a few days the 1,400 foot level will be reached."—*Idaho Avalanche.*

MONTANA.

"The smelter at Glendale was completed and commenced operations this week. Its working capacity is 50 tons per day. Wm. Roe came in from his mine on Virginia Creek last night, bringing with him $14,000 in gold dust, the result of three months' work."—*New North West.*

"Mr. Paronin has shipped 30 tons of copper ores from the Mountain and Parrot lodes to Glendale. McMinn & Clark located a gold bearing lode on American Bar lately; assays shows the rock to be worth $69 per ton, the gold being free."—*Butte Mirror.*

NEVADA.

"The Eberhardt & Aurora Mill, at Hamilton, has started up for a two months' run. New mines have been discovered twelve miles north of Carlin. The district is called Richmond. The Rye Patch 10-stamp mill is running. There are 17 quartz mills, 2 battery mills, and 7 pan mills, for tailings, in Storey County.

"The Consolidated Virginia clean up for the past mouth amounted to $1,445,780.31; California clean up, $1,403,296.45. Total of both mines, $2,849,076.76.

"*The Comet.*—A tunnel has been run between 300 and 400 feet long, to crosscut the ledge, which shows a fine body of ore. A winze has been sunk to a depth of 60 feet in ore that will assay from $100 to $5,000 per ton in silver and gold. Five hundred tons of this ore was milled in July, and there is now about 150 tons lying on the dump. The mine is now in shape to produce ore enough to keep a 10-stamp mill running steadily.

"*Comet Extension.*—They are still drifting on the ledge, and some of the finest specimens of gold quartz found on the Comstock in late years have been taken out.

"*William Penn.*—The tunnel is now in 865 feet, and it is thought the main ledge will be reached in running 15 feet farther. A ledge ten feet in width was passed through when in 800 feet, and one shaft will be put on to-day to drift on it. The face is showing a very good quality of quartz carrying both gold and silver."—*Lyons County Times.*

"A large number of our citizens paid a visit to the Jack Rabbit Mine in Bristol District on Saturday and Sunday last. They all expressed themselves to the effect that it was the biggest prospect they had ever seen for the amount of work done."—*Pioche Record.*

"The mountains at the head of Birch Creek, in which quartz ledges have been recently discovered, is fairly covered with prospectors. One party found a ledge 15 feet wide—all mineral—but was ignorant of its exact character. Some of it will be brought to town to determine its value."—*Reveille.*

"The Eureka Consolidated Furnaces received 218 tons of ore on one day recently, and run out 1,000 bars of bullion, a little more than 41 bars to the hour, and will aggregate 105,000 lb."—*Eureka Republican.*

"Twelve bars of bullion, worth about $15,000, are shipped from Leeds District daily."—*Eureka Sentinel.*

PETROLEUM NOTES.

PRODUCTION, STOCKS, SHIPMENTS, ETC., OF THE PENNSYLVANIA OIL FIELDS, BY DISTRICTS, FOR AUGUST, IN BARRELS OF 42 GALLONS.

Number and Name of Districts.	PRODUCTION ACCOUNT. No. bbls. of oil on hand at the wells at the close of the month.	No. of bbls. of oil produced in the month.	Average per day for the month of 31 days.	No. of bbls. of oil in iron tanks, pipe lines and refineries.	Total No. of bbls. of oil held in all the districts.	DRILLING WELL ACCOUNT. No. of wells producing.	No. of wells drilling.	No. of wells completed in August.	Aggregate daily production of new wells.	Daily average of new wells.	No. of Rigs building.	Dry holes in August.
Butler	80,000	770,784	24,864	2,056,372	2,136,372	4,040	249	126	1,802	14¼	153	20
Parker												
Clarion												
Scrubgrass....	3,500	186,000	6,000	12,000	15,500	245	17	44	2,200	50	25	12
Franklin.....	500	12,400	400	24,000	24,500	358	16	4	16	4	10	1
Reno	.....	3,100	100	8,000	8,000	31	....	....	....	....	....	..
Oil City.....	1,000	31,000	1,000	249,600	250,600	358	6	8	40	5	7	2
Rouseville ...	400	12,400	400	8,000	8,400	197	8	3	12	4	3	1
Rynd Farm...	450	12,400	400	7,950	8,400	125	....	2	8	4	....	..
Columbia.....	2,560	4,340	140	5,000	7,560	31	....	....	....	....	....	..
Petroleum Cr.	400	3,100	100	15,000	15,400	50	....	....	....	....	....	..
Shamburg	400	6,200	200	10,000	10,400	96	2	2	8	4	1	1
Titusville.....	1,200	46,500	1,500	69,006	70,206	740	12	10	40	4	14	4
Pithole.....	400	6,200	200	13,081	13,481	78	1	2	10	5	1	1
Fagundas.....	2,050	6,200	200	35,050	35,100	150	....	2	10	5	...	1
Tidioute.....	7,000	13,330	430	88,000	95,000	240	....	2	12	6	3	..
Warren.....	1,000	15,500	500	17,122	18,122	110	7	8	34	4¼	10	3
Bradford.....	8,000	137,330	4,430	125,203	133,203	700	90	40	500	12½	104	1
Beaver.....	302	6,975	225	1,998	2,300	135	9	3	3	1¼	7	1
Totals	109,162	1,273,759	41,089	2,743,382	2,852,544	7,684	417	255	4,695	18·4	338	48
Total for July.	109,224	1,189,005	38,355	2,895,504	3,004,728	7,567	365	317	5,447	18	335	58

—*Petroleum Reporter.*

PETROLEUM DISCOVERY IN KENTUCKY.—Petroleum has been discovered at North Middletown, Bourbon County, Ky.

ORTEGA HILL OIL COMPANY.—We note the recent incorporation of this company with a capital stock of $200,000 to operate oil wells in Santa Barbara County, near Ortega Hill, Cal.

WAGES IN THE OIL REGIONS.—The following table of wages comprises rates which are nearly uniform throughout the oil regions :

	Per day.		Per day.
Drillers, best	$4 00	Pampers, lowest	$2 50
Drillers, lowest	3 00	Laborers, best	1 50
Pampers, best	3 00	Laborers, lowest	1 25

THE PETROLEUM INDUSTRY IN RUSSIA.—The Russian capitalists who are working the petroleum wells are now laying down iron pipes from the wells to the Black Sea coast, where ships will be loaded by pneumatic pumps. It was recently reported that an American company had petitioned the Government for a concession to work all the petroleum wells in Asiatic Russia. It was pointed out to the authorities, however, that the Americans are aware that Russian petroleum will enter into serious competition with American, and that this was an effort to paralyze the trade.

PIPE MILEAGE IN THE PENNSYLVANIA OIL REGION.—The total mileage of iron pipe used for conveying oil in the oil regions of Pennsylvania is 2,081¾. The pipe used is what is known as lap-welded or butt-welded tubes, averaging from two to six inches in diameter, with wrought iron screw couplings. This pipe is laid on the surface of the ground, along roads or across the country in the most indiscriminate manner. To allow for expansion and contraction, the pipe is laid not in a straight line between two points, but in curves, curves not being so great but that the force of contraction will draw the pipe without breaking it.

THE PETROLIA, CANADA, OIL MARKET.—The *Monetary Times*, of the 21st inst., says : "The shipments of crude are increasing, and the business generally improving. There is now no doubt that it is too late for any combination or ring to be formed this year, as most of the oil dealers are well supplied, and the American market is so low that no rise in price here could be maintained. Good American oil, No. 1 refined, can be delivered here, duty paid, at 21 cents per gallon (W. M.). Developing is still going on, but not with that vigor which a good market would authorize. The smallness of the wells lately got is also a damper, and new territory must be found, or the oil-producing lands of Canada will soon be drained. Markets : crude, $1.35 per barrel ; refined per gallon, 13 cents, W. M."

SANTA CLARA (CAL.) PETROLEUM CO.—The shareholders in the Santa Clara Petroleum Company recently transferred their stock to a party of Eastern capitalists, represented by an agent in San Francisco. The transfer was made reluctantly, and only because certain of the shareholders were unprepared (financially, we suppose) to work the mine to a successful termination. Of late days not much work has been done, and the mine has been developed to but a very small extent, although there is every indication of paying oil being in large quantities. The new company, under the same corporate name, backed by a large amount of capital, will prosecute the work on a more extensive scale, and will soon have the mine well developed. The new company has purchased all of the land adjoining the mine which could be purchased, and will soon erect its works. The mine is situated about 15 miles from Santa Clara in what is known as Moody's Gulch. The existence of petroleum in that locality has been no secret ; on the contrary, it has been known for years, and an attempt was once made to mine for it. The work of doing so was badly conducted and the enterprise given up as a failure. This second attempt, however, has every indication at present of being successful.—*San Jose (Cal.) Mercury.*

DEODORIZING PETROLEUM.—M. Mason, of Lyons, has succeeded in removing the disagreeable odor of petroleum by the following process : Into a vessel containing 225 lb. of petroleum, are separately introduced by means of a funnel, 2 oz. each of sulphuric and nitric acids, and 11·1 lb. of stronger alcohol are carefully poured upon the surface of the petroleum. The alcohol gradually sinks to the bottom, and when coming in contact with the acids heat is developed, and some effervescence takes place, but not in proportion to the quantity of the liquids. Ethereal products of a very agreeable odor are formed, and the substances thus treated acquire an analogous odor, at the same time becoming yellowish in color. The operation lasts about an hour, after which the liquids are thoroughly agitated for some minutes with water, and after resting for eight or ten hours the purified petroleum is drawn off. The lower stratum, which is a mixture of the acids, water, and alcohol, may be used for deodorizing the heavy oils of petroleum, by agitating them well for twenty minutes, and after twelve hours, washing the oil twice with milk of lime, to remove the free acids. It will then have the same but a weaker odor, as the light petroleum first treated, and answers well for lubricating purposes. Petroleum thus purified may be used in pharmacy for many purposes. All the tinctures for external use may be prepared with it, like the tincture of arnica, alkanet, and camphor. It may be used for dissolving ether and chloroform like alcohol, and, combined with fats or glycerine, promises to be of great utility in the treatment of skin diseases, etc. The alcohol used in pharmacy might be replaced by this purified petroleum.

PURCHASE OF THE EMPIRE TRANSPORTATION COMPANY BY THE PENNSYLVANIA RAILROAD COMPANY.—At a meeting of the Board of Directors of the Pennsylvania Railroad Company, on the 18th inst., an arrangement was virtually consummated by which that company becomes the owner of a large equipment and other property of the Empire Transportation Company, connected with the transportation of traffic over the lines of the Pennsylvania Railroad. The company was organized in the year 1865, under a charter from the State of Pennsylvania. Its capital stock is about $4,000,000. It runs its cars over four different roads between Erie and New York. One of the company's principal branches of business is the handling of oil, to which its "Green Line" is devoted, except such as goes from Oil City, which is moved by the Empire Line. The company's oil depots for the New York trade are in Communipaw. But in the oil trade the Empire Transportation Company has gained the ascendency by obtaining the control of the pipe lines by which oil is gathered from different portions of the oil districts to the principal points for transportation. In 1866 the company purchased a controlling interest in the Titusville Pipe Company, and later the entire property was acquired by the company. At various subsequent times the company purchased the interests of other pipe line companies, until at the present time it owns 520 miles of pipe, and is the only and a very important competitor of the Standard Oil Company of this city.

POSITION OF THE PETROLEUM MEASURES IN THE CLEARFIELD, PA., DISTRICT.—The Osceola *Reveille*, of the 15th inst., says : "The committee intrusted by the oil company with the work of locating the first well has selected a favorable site on Beaver Run, near its confluence with the Moshannon. The valley here seems to be a few feet lower than the second or B vein of coal ; consequently, in boring, the drill must first penetrate a stratum of hard sandstone, under which will be found the second conglomerate, shale rock, black slate, coal seam A, fire-clay, shale rock, and fine, white glass sand, before the bottom conglomerate is reached, making, in all, a depth of about 80 to 85 feet. The conglomerate may be 100, but perhaps not more than 50 feet in thickness. Below this, the Umbral red shales occur, under which we may expect to find a thick bed of proto-carbon, or false coal. Next in the series, immediately under the proto-carbon, is a hard white sand rock, known as the Vespertine formation. Under this lies the Ponent or red sand and shale. It is much thicker than any of the upper rocks, and caps the upper oil measures. The colored shales and sand beneath are known as the Vergent formation, and compose the first oil rocks. The bituminous slates, shales, and limestones under the Vergent form the Cadent series, in which the lowest oil is found. If very deep, these rocks yield nothing but gas or light naphtha. At the point selected for boring, the lowest oil-bearing rocks should be found within 1,000 feet, and we believe will be, unless the bottom conglomerate shows a thickness of more than 100 feet."

THE NEW YORK MARKET.—The *Shipping List* of the 26th inst. says: Petroleum, Crude, has been in moderate demand, but prices have advanced, the market closing at 9 cents bulk and 11½ in bbls.

Refined has been excited, and prices ars decidedly higher; the sales and resales foot up about 55,000 bbls. at 15¼@15⅞ cents for October delivery, 15½@16 on the spot, including 5,000 bbls. at the higher price; 8,000 do. in Philadelphia for October at 15⅝, and 8,000 do. in Baltimore, 15⅜, closing at 15⅞@16 here, 16⅝@16¾, for high test, 15¾@15⅞ for ordinary test in Baltimore and Philadelphia. Cases are quiet but firmer; we quote sales of about 30,000 cases at 18@20 cents.

Naphtha remains steady at 7@8 cents—nominally.

Residuum is still nominal at 10 cents. We hear of no sales.

Certificates have been active; sales to the extent of 135,000 bbls. United have been made at $2.38⅛@$2.45, including 40,000 bbls. yesterday at $2.38⅛@$2.42½, and at Oil City, 75,000 bbls. at $2.40@$2.45, all regular. Oil City quiet and firm; United, $2.40⅝ bid. Parker's quiet and dull at $2.40⅝.

The exports comprise from New York 39,300 bbls. refined, and 24,000 cases. From Philadelphia, 5,000 bbls. refined, and 5,550 do. crude. From Baltimore, 6,500 bbls. refined. Exports of refined petroleum :

For the week ending Sept. 22	gallons	3,359,884
Since January 1		173,979,825
From other ports		70,627,910
Total	gallons	247,967,619

THE GRAVEL BED OIL WELLS and territory in the vicinity of Titusville, Pa., are creating quite an excitement. The wells are only dug to a depth of eighteen feet, where, between two layers of blue clay, a gravel bed is found which contains the oil. At present fifteen wells are in operation, yielding 103 barrels per day. A large number of leases has been taken recently, commanding from $30 to $50 royalty for 30 feet square. One of the wells recently completed is yielding 25 barrels per day. Many of the wells are pumped by hand.

THE STANDARD OIL COMPANY.—The Cumberland *Alleghanian* of the 20th inst. says : "This company proposes to have a monopoly of the coal oil trade, and will even force that great railroad monopoly, the Pennsylvania Company, to terms. How this will affect the Baltimore railroad freights, we have not learned, though it is intimated the Standard Company has secured a drawback of 50 cents per barrel, the freight now being $1.50." This company has purchased the Keystone Pipe Line, from Millerstown to Freeport, Pa., for $100,000, and is extending its line from the latter point to its refineries at Pittsburg, at a cost, it is said, of $2,500 per mile. This company's shops at Cleveland, Ohio, are turning out 12,000 barrels per day. With reference to the extent of the influence of this company on the oil market of the country, a correspondent of the Chicago *Inter-Ocean* writes :

"I can hardly conclude this letter from the oil regions without a word in regard to the economic view of the great combination which controls the world's oil market, and which can to-day hold sufficient oil in this country to make all Europe, as it did last year, pay whatever price it chooses for the privilege of burning oil. Taking crude oil at the average rate of last year, as shown in above table, and the yearly value of the Pennsylvania oil trade comes to over $20,000,000 ; this oil after it is refined, and selling at the price it did last winter, must be worth annually over $30,000,000. In 1876 the Standard Oil Company successfully held all the refined oil of this region, and made Europe buy at 26 cents per gallon, while it was run up as high as 40 cents. The harvest the company reaped, I am informed by reliable men in this city, was something enormous, and it virtually puts them in a position to control the trade again when the time comes. As this is a question that will interest every grocery store in the Northwest, and, indeed, every reader of this paper, who is more or less affected by the high price of kerosene, I took some pains to inquire into the origin of the Standard Oil Company during my stay here, and find that about ten years ago it started at Cleveland, and from the start seemed to have some inside arrangement with railroad companies. It was enabled to bring coal to market cheaper than most companies. It soon began to build refineries in different large railroad centers, notably New York, Philadelphia, Cleveland, and Pittsburg. No other companies could obtain from the railroads the advantages this company did, so we soon find the Standard Oil Company beginning to open its ponderous jaws and gobbling up the smaller refineries. It began on the creek, and finally bought up all the refineries there ; next it came to Pittsburg, and at least half of the Pittsburg refineries were soon controlled by the monopoly. Philadelphia came next, and finally Parkersburg, West Virginia, in 1876. With the control of nearly all the refineries in the country, it is hardly to be wondered at that the Standard Oil Company was enabled in 1876 to control the market, and hold refined oil in New York at 26 cents, and hold it at that price until the merchants of London, Edinburgh, Antwerp, Amsterdam, Rotterdam, Bremen, Hamburg, and Stettin were obliged to buy at that price."

NOTES.

FINAL CLOSING OF THE CUMBERLAND (MD.) ROLLING MILLS.—Orders have been issued by the Baltimore & Ohio Railroad Company for the complete and final suspension of operations at their iron works in this city, Monday next, the 30th inst., and there is no probability whatever that the works will ever resume as rolling mills.—*News.*

IMPORTANT SUIT FOR MINING LANDS.—A suit is to come up in the United States Court, in Louisville, Ky., in October, in which the plaintiffs, Kate Applegate and others, all Pennsylvanians, claim certain property, amounting to 80,000 acres of land, now occupied by the Lexington and Carter County Railroad and Mining Company, the Norton Iron Works Company, the Buena Vista Furnace Company, the Hunnewell Furnace Company, and numerous private parties.

COMPARATIVE EXPLOSIVENESS OF NITRO-GLYCERINE.—In testing the comparative explosiveness of nitro-glycerine, in the crystallized and the liquid state, Beckerhinn used a drop-block of wrought-iron weighing 2·130 kilograms, having at its lower end a hardened steel point of 7·068 square millimeters. The nitro-glycerine was spread in a thin layer on a flat anvil of Bessemer steel, and the weight was dropped from different heights. The liquor exploded at a fall of 0·78 meter, but the crystallized or frozen nitro-glycerine only at 2·13 meters.

GERMAN COAL.—The *Cologne Gazette* says that the trials made by the German Admiralty of different sorts of coal have shown that Westphalian coal is in many points superior to English coal, which was formerly used exclusively for the German steamers. These now take Westphalian coal in the German ports. The association for the export of Westphalian coal now proposes to the Government to establish, through the agency of well-known resident German merchants, coal stations at certain points—such as Flushing, Lisbon, Carthagena, Catania, and perhaps also Alexandria.

RIGHTS OF OWNERS OF MINING RIGHTS—DUBUQUE, IOWA, September 16.—A case of great importance to miners was decided yesterday in the District Court. It was known as the suit of McAleer *vs.* Jones & Starr. The latter parties leased certain mining lands several years ago, erected costly machinery, and worked the ground some time. The property meantime changed ownership several times, and the last purchaser, who had bought at a tax sale, endeavored to oust the lessees by procuring an injunction. After long fighting this injunction has been removed, the judge deciding that even a tax title does not deprive the lessees of the ground of their mining rights.

RESUMPTION OF MINERS AND IRON WORKERS.—Coal mining was resumed, September 14, at the Kenosha Mine, in the southeast part of La Salle township, Ill., at eighty cents a ton "rough and tumble" weight.

In the Circuit Court of Jackson, Mich., September 14, three of the five miners arrested for assault with intent to kill, were convicted of assault and battery. The assault was made by some of the strikers upon those miners employed from Illinois, who were digging coal during the strike which is now ended. The other two were discharged.

The strike at the American Iron Works, in Pittsburg, ended on the 18th inst., and the employes, over 1,500 in number, resumed work at the old wages on the 19th. They were idle eight weeks, the strike having commenced on the Tuesday following the great riot, when they demanded an advance of 25 per cent. When they struck, the mills were running on full time.

CERRO DE PASCO SILVER MINES.—In a letter to the London *Mining Journal* of the 8th September, we find the following: "The *Mining Journal* of last week contains some statements, reprinted from the Panama *Star and Herald*, concerning these mines, which cannot, in my opinion, be borne out by facts. In the first place, it likens this silver-bearing deposit to the 'Comstock lode on a grander scale.' This is an error, inasmuch as the mines of Cerro de Pasco are not in a lode at all, but are situated in a flat mass of mineral rock, composed of gossan, iron, quartz, and pyrites. The deposit, which is exposed at surface, lies in a hollow or basin, and is from a half to three-quarters of a mile in diameter, surrounded chiefly by mountains of limestone and sandstone, and it has no traceable inlet or outlet across these mountains. In some instances, however, where the mass abuts against the base and slopes of the hills, there are observable several small veins containing some lead ore, but they bear no likeness whatever in composition to the silver-bearing ground herein referred to. Furthermore, these veins perish at short distances in the limestone, and have no visible existence beyond. As further proof of its being only a horizontal accumulation or deposit of lode stuff, I beg to inform you that I was engaged by the late contractors, Messrs. Wyman and Harrison, to superintend the underground drainage of these mines, together with sinking two of the shafts 45 yards below the adit, which would give a depth of 150 yards from surface. I proceeded to Peru with a company of men for that purpose in December, 1869, and remained at Cerro de Pasco engaged in the work for nearly two years. While the work was progressing, I expressed an opinion to the effect that in sinking the shafts they would in all probability pass through this mineral formation. The statement was contained in an article on these mines, etc., written on the spot on February 24, 1871, and which you did me the favor to publish in the supplement to the *Mining Journal* on May 6 following. This opinion was subsequently verified at the Gauricocha shaft. This shaft being in an extremely soft and difficult ground for sinking, the contractors sub-let it to myself, and when it had reached a depth of 38 varas (yards) below adit, it came upon a hard, spotted kind of rock resembling gray porphyry. Immediately under this was a bed of silt, with loose fragments of water-worn limestone. It appeared to us as if the shaft had now reached the surface of a past epoch, and there was nothing in the material which bore the slightest semblance to the huge mass of mineralized rock reposing on it.

W. R. RUTTER."

NEW INSTRUMENT FOR UNDERGROUND LEVELING.—At a meeting of the Institute of Mining and Mechanical Engineers, in the Wood Memorial Hall, Newcastle, a paper, by Messrs. T. Lindsay Galloway, M.A., and C. Z. Bunning, was read "On a New Instrument for Leveling Underground." The general principle of the instrument was brought under the notice of the writers by the system adopted by Dr. Luigi Aita in taking the levels for sanitary works in Padua. They have found reason, however, while retaining the general principle of Dr. Aita's instrument, to make several improvements in its construction, and an important change in the mode of applying it. The apparatus consists essentially of two glass tubes connected together by an india-rubber pipe, which may be of any convenient length—say of 10 yards upwards. Each glass tube is attached to a suitable scale, upon which are marked subdivisions, in the same manner as upon the ordinary leveling staff. The tubes are filled up to about the center of each scale, with water colored so as to render it more distinctly visible. If now the scales be held vertically upon any sloping or uneven surface, and at any distance apart that the length of the india-rubber pipe will admit of, the difference of the readings denoting the position of the colored liquid in each tube will represent the difference of height between the stations at which the scales are held. In the instrument exhibited the length of the glass tubes was 3 feet, and of the india-rubber connection 12 yards. This instrument had been specially constructed to meet the requirements of low workings in mines, but longer scales and tubes might be employed with advantage, either in surface leveling or in mines where the workings are high. In thus adopting long glass tubes, and attaching them permanently to the scales, the writers found it advisable to depart considerably from the form of apparatus used by Dr. Aita. The glass tubes in the Aita level are only a few inches in length, and are movable upon the scales being attached by means of a sliding frame, which can be raised or lowered at pleasure. Instead, however, of the liquid, as in the present apparatus, simply finding its own level in the tubes, the tubes themselves are shifted in the Aita instrument so as to suit the level of the liquid. The apparatus in its present form, besides being more simple, is necessarily quicker in its action in adjustment of any sort being required before reading. In order to expedite its use still farther a short piece of tube of small diameter has been placed near one end of the india-rubber hose, which resists the oscillations of the liquid, and at each observation brings it rapidly to rest. By this means a leveling can be made almost as quickly as the apparatus can be moved from station to station, and many sights may be readily taken during the time which would be spent in simply getting up the telescape level and adjusting the plate screws and focus.

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STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Sept. 22, and years from Jan 1st.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co.	....	1,283,899	53,098	1,301,721
D. L. & W. RR. Co.	....	1,311,352	60,745	1,118,625
Penn. Coal Co.	61	715,673	29,775	703,396
L. V. RR. Co.	5,140	606,924	15,182	671,548
P. & N. Y. RR. Co.	....	32,931	...	17,488
C. RR. of N. J.	2,550	870,707	37,327	871,872
Penn. Canal Co.	2,873	237,697	14,870	279,739
	10,624	5,059,183	210,997	4,964,389
Lehigh Region.				
L. V. RR. Co.	103,310	2,270,505	74,162	1,764,013
C. RR. of N. J.	44,373	1,019,774	39,648	918,325
D. H. & W. B. RR.	1,272	17,149	742	30,357
	148,955	3,307,428	114,552	2,712,695
Schuylkill Region.				
P. & R. RR. Co.	180,811	4,717,334	147,874	3,009,794
Shamokin & Lykens Val.	†6,631	430,185	27,144	585,497
	187,442	5,147,519	175,018	3,595,291
Sullivan Region.				
Sul. & Erie RR. Co.	1,070	11,970	....	27,663
Total	348,091	13,526,100	500,567	11 300,038
Increase	....	2,226,062	....	....
Decrease	152,476	....	....	....

† This report is not full.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

Receipts and shipments of coal at Chicago, Ill., for the week ending Sept. 22, and year from January 1:

	Week. Tons.	Year. Tons.
Receipts	97,043	1,150,061
Shipments	8,245	266,873

Comparative statement of the coal on hand by the Philadelphia & Reading Coal and Iron Company, on July 1, 1877, and September 15, 1877:

	July 1. Tons.	Sept. 15. Tons.
At Port Richmond	86,177	66,262
Yards at New York	116,719	87,267
New York and Eastern Depots	46,120	30,353
Afloat at New York	68,094	21,468
Total at respective dates	317,110	205,350

The Exports of Coal from Baltimore for the week ending Sept. 22 were — tons, and since January 1st, 22,994 tons as against 22,589 tons for the corresponding time in 1876.

Shipments of coal at Pictou, N.S., for the week ending Sept. 22 and year from January 1:

	Week.	Year
To Canada	1,600	38,509
" United States	200	19,285
" Other Provinces	4,911	52,230
Total tons	6,711	110,024

Coals Cleared on the Canals of the State of New York for the week ending Sept. 22, and years since the opening of navigation:

Tons of 2,000 lb.	1877.		1876.	
	Week.	Year.	Week.	Year.
Anthracite	43,260	649,644	27,688	506,581
Bituminous	10,446	185,001	10,168	202,477
Total amount cleared	53,706	834,645	37,856	709,058
Of the above, there was cleared at tidewater ports, viz., New York, Albany, West Troy, and Waterford.	22,403	551,807	...	....
Cleared at internal ports	31,303	282,838	...	....

Belvidere Delaware RR. report for week ending Sept. 22.	Week	Year. 1877.	Year. 1876.
Coal for shipment at Coal Port (Trenton)	94	12,638	188,118
" " " " South Amboy	14,234	404,279	308,987
Coal for distribution	4,801	130,242	112,330
Coal for Company's use	1,442	59,377	47,585

The shipments of coal at Cleveland, Ohio, for the week ending Sept. 25 were as follows: shipped coastwise, 12,698 tons; total for year, 199,461 tons; foreign shipments, 1,835 tons; total for year, 63,692. Total of coastwise and foreign shipments for week, 14,533; for year, 263,153.

Receipts of Coal at Boston, for the week ending Sept. 21 and years from Jan. 1.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.	Week.	Year.
From				
Alexandria and Georgetown	965	43,192	1,400	46,116
Philadelphia	15,613	483,003	16,195	378,310
Baltimore	2,136	107,730	1,692	109,590
Other places	2,020	192,641	7,837	203,050
Great Britain	1,636	3,272	...	4,018
Nova Scotia	413	27,127	2,101	17,305
Total	22,783	856,965	29,225	758,389

Perth Amboy business:

	Tons.
Received for the week	41,144
Shipped for the week	39,269
On hand Sept. 22	62,578

The Receipts of Coal at Rondout, N.Y., by the Delaware & Hudson Canal for five days ending Sept. 26 were 106 boats, carrying 13,406 tons.

The production of Bituminous Coal for the week ending Sept. 22 was as follows:

Tons of 2,000 lb., except where otherwise designated.

	Week, Tons.	Year, Tons.
Cumberland Region, Md..		
Tons of 2,240 lb	50,188	1,062,463
Barclay Region, Pa.		
Barclay RR. tons of 2,240 lb	6,539	236,242
Broad Top Region, Pa.		
Huntingdon and Broad Top RR.	2,570	100,249
*East Broad Top	1,134	37,377
Clearfield Region, Pa.		
*Snow Shoe	515	27,149
*Tyrone and Clearfield	26,219	937,822
Allegheny Region, Pa.		
*Pennsylvania RR.	2,650	133,596
Pittsburg Region, Pa.		
*West Penn. RR.	3,546	126,203
*Southwest Penn. RR.	556	28,518
*Penn & Westmoreland gas coal, Pa. RR.	19,782	450,157
*Pennsylvania RR.	10,594	252,964

*For the week ending Sept. 21.

The Production of Coke for the week ending Sept. 21.

Tons of 2,000 lb.	Week.	Year.
West Penn. RR.	1,083	42,920
Southwest Penn. RR.	11,585	434,752
Penn & Westmoreland Region, Penn. RR.	1,156	45,486
Pittsburg, Penn. RR.	1,470	81,632
Total	15,294	604,790

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Sept. 28, 1877.

Anthracite.

Since our last the Lehigh & Wilkes-Barre coal company's men have resumed work at an advance of 10 per cent. over wages paid previous to the strike. The following letter from a well-informed correspondent states the condition of the case:

WILKES-BARRE, Sept. 26, 1877.

A mass-meeting of the Lehigh & Wilkes-Barre men, held this day at Sugar Notch, decided a few moments ago to accept the terms offered by Mr. Charles Parrish, and work is to be resumed at once. Terms, as I learn, are as follows: Ten per cent. advance for this and October month, but no sliding scale, and no further guarantee.

The two men, J. Harrison and Frank Bovey, now in Pittsburgh jail, on account of interfering with the J. C. Railroad, to be released on bail. The bail will now be accepted since the men have agreed to resume operation. This virtually settles matters for the Wyoming, and in all probability for the Lackawanna as well.

Latest.—The miners have had another meeting, and the fire bosses, etc., are to resume work to-morrow, and the miners go in as soon as assured that the two men mentioned above are released and reach home.

WYOMING.

A dispatch from Wilkes-Barre states that the Warriour Run Mines have also resumed. It is quite probable that most of the individual collieries will resume in a few days. The Pennsylvania Coal Company's miners held a meeting on the 26th inst., and adjourned, appointing a committee to confer with the other companies' miners. Another meeting was to have taken place to-day, the result of which we have been unable to learn. There are no indications of the Delaware, Lackawanna & Western, and Delaware & Hudson Canal Companies' men resuming work. The Lehigh miners have made a demand for the basis of 1875. The operators met in Hazleton yesterday (27th inst.), and refused to grant the demand. We are informed that, if this basis were adopted, it would not give the miners an advance at present.

The Lehigh & Wilkes-Barre Coal Company issued a circular yesterday, which created quite a stir in the trade. The following are their quotations, f. o. b., Port Johnston, N. J.:

	Lump.	Steamer.	Broken.
Old Company's Summit	$3 75	....	$3 40
Honey-Brook Lehigh	3 75	....	3 40
Wilkes-Barre	3 25	$3 25	3 25
Plymouth red-ash	....	....	3 25
	Egg.	Stove.	Chest.
Old Company's Summit	$3 40	$3 50	$3 00
Honey-Brook Lehigh	3 40	3 50	3 00
Wilkes-Barre	3 25	3 50	3 00
Plymouth red-ash	3 35	3 65	3 15

These prices were considered by many as unnecessarily low; but the fact is, that considerable coal has been sold at as low, and in some cases even lower, prices than the above, and now that the market is to receive a greater supply than heretofore, it is questionable if even these can be maintained. The prices of the other producers have not been fully settled, but there is no question that they will openly conform to those of the Wilkes-Barre Company. The Philadelphia & Reading Coal and Iron Company is still quite short of several sizes, but shows an inclination to take its old position on such sizes as it can offer. Some of the producers who have been in the market steadily have secured a liberal supply of orders, and find themselves with a demand for all the coal they can bring to market at present; but there is quite a falling off in new orders, and unless there be quite a change in the situation, prices will be considerably lower at the end of the next month.

The production is steadily increasing, having reached 348,091 tons last week, as compared with 341,713 tons the previous week, and 500,567 tons during the corresponding week of 1876. The total production since January 1 has been 13,526,100 tons against 11,300,038 tons during the corresponding period last year, showing an increase this year of 2,226,062 tons. The resumption of the mines at Wilkes-Barre will bring the weekly production up to, or over 400,000 tons.

Owing to the very active demand for grain freights on the Erie Canal boats prefer returning empty to accepting low rates of freight, and as a consequence the rates have advanced, and are, with tolls, as follows: To Buffalo, $1.40@1.50; Rochester, $1.30@1.40; Syracuse, $1.10@$1.20; Utica, $1, and Oswego, $1.20. Despite this advance there is still a very active demand for boats, owing to the approach of the close of navigation.

A. S. Swords is offering Pittston small chestnut at $2.25 per gross ton at New York.

We refer to our Philadelphia letter for advanced line prices, etc.

Bituminous.

We note sale of 15,000 to 20,000 tons of Georgetown coal made to the New Haven Railroad Company about ten days ago. Terms private, but prices supposed to be very low. This is the only important business noted in bituminous coal. The output of the Cumberland region last week was slightly in excess of the previous one, while the Clearfield, although still showing a large output, marks a decline on the previous week. Freights from Georgetown and Baltimore have a rising tendency still.

Gas Coal.—The Boston *Commercial Bulletin* of Sept. 22, says: "The only local movement of interest is in gas coals. The steamer *Red Star* arrived early in the week from Newcastle, England, with 1,636 tons for the Boston Gas-light Company. This is the first arrival of the kind for five years, and is very significant. Several more cargoes are on the way to the same concern, and it is understood that the gas company has contracted, or will contract, for all its supplies, either in England or Nova Scotia, until the present monopoly in American gas coals, of which the Pennsylvania Central and the Baltimore & Ohio are the head, shall cease. The same policy, it is understood, is being pursued by the Newton and Watertown, the Cambridge, and other suburban gas companies."

New York.

Wholesale Prices of Anthracite Coal f. o. b. at the Tide Water Shipping Ports per ton of 2240lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Cross Creek at Port Johnston	3 25	3 65	3 65	3 65	3 75	3 50
Hazelton at Perth Amboy	3 65	....	3 65	3 65	3 75	3 40
Mount Pleasant at Perth Amboy	3 65	....	3 65	3 65	3 75	3 40
Old Co.'s Summit at Pt. Johnson	3 75	....	3 40	3 40	3 50	3 00
Honey Brook Lehigh at Port Johnson	3 75	....	3 40	3 40	3 50	3 00
Wilkes-Barre at Port Johnson	3 25	3 25	3 25	3 25	3 50	3 00
Plymouth Red Ash at Pt. Johnson	....	....	3 25	3 25	3 65	3 15

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$5 50
" " at S. Amboy	5 00	5 50
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt	4 50	5 65
Despard, West Va	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburg Orrel, Md. " "	4 50	6 00
Cannelton Cannel, West Va	....	10 00
" Splint " at Richmond	6 00	7 00
" Gas Coal at Richmond	4 00	5 65
Peytona Cannel W. Va. at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va	2 85@3 10	4 35@4 50
Cumberland, at Baltimore	3 10@3 25	4 35@4 50
Clearfield f. o. b. Canton, Baltimore	3 25@....	4 35@4 50

Clearfield "Eureka" and "Franklin" at mines per ton 2,000 lb. ..... 75c.; f.o.b.
Baltimore and Philadelphia per ton of 2,240 lb., $3.25; f.o.b.
South Amboy, $4.25; alongside at New York, $4.50.

Foreign Gas Coals.

	Sterling.	Am. cur'cy
Newcastle, at Newcastle-on-Tyne	8/6@10/6	5 50@6 00
Liverpool House Orrel, at Liverpool	25/	13 00
Ince Hall Cannel "	35/6	18 00
" Gas Cannel " ...	25/6	10@10 50
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S.	1 75	4 50
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 60	4 25
Lingan, at Lingan Bay	1 75	....
International mines at Sydney	1 75	4 50
Pictou, Vale mines, at Pictou	2 00	4 75

Retail Prices in New York.

Anthracite.

Per 2000 lbs.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, delivered	$4 50	$4 50	$4 50
Lackawanna coal, delivered	4 25	4 25	4 25
Wilkes-Barre, delivered	4 25	4 50	4 25
Lehigh and Locust Mountain, del'd	4 25	4 50	4 25

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$18 00
Liverpool House Cannel " " "	18 00
American " " "	11 00
Cannelton Block, or splint, " " "	10 00
American Orrel " " "	11 00
Red Bank Cannel " " "	7 00
Cumberland " " "	9 00

Baltimore. Sept. 25, 1877.

Specially reported by Messrs. E. STABLER JR., & CO.

Wholesale Prices.

Hard White Ash, Free Burning White Ash, etc.

AFLOAT BY CARGO PER TON OF 2,240 LB.

Lump and Steamboat	$3 50	Stove	$4 00
Broken	3 75	Chestnut	3 50
Egg	3 75		

In cars in dealers' yards or on switch, 15c. per ton additional

Lykens Valley Red Ash.

AFLOAT BY CARGO.		BY RAIL IN CARS.	
Broken	$4 13	Broken	$4 30
Egg	4 38	Egg	4 55
Stove	4 38	Stove	4 55
Chestnut	3 78	Chestnut	3 95

From wharf or yard to the trade, 75c. per ton additional.

Bituminous.

George's Creek, f. o. b. at Locust Point	$3 50 to $3 60		
Clearfield, "	Canton	3 30 to	3 40

Boston. Sept. 22, 1877.

The arrivals of provincial coal, all previously contracted for, have been as follows: *Alice S.*, Dorchester, N. B., 102 tons: *Minnie*, Dorchester, N. B., 123 *Arab*, Port Caledonia, C. B., 188 tons; total, 411 tons.

In anthracite there is little of interest. Prices favor the buyer. There is considerable irregularity, and cutting among retailers, with sales all the way from $4.75 to $5.50.

Coal freights from Philadelphia now rule at $1.20 @$1.25; Baltimore, $1.50@1.60; Alexandria and Georgetown, nominally, $1.60@1.70; New York, $1@1.10. It will be noticed that there has been a slight advance this week in freights from Baltimore, Alexandria, and Georgetown.

We quote Boston wholesale prices as follows:

Anthracite, broken	$4 00@4 25	Cannel, English	$16 00
do. egg	4 00@4 25	do. Buckeye	10 00
do. stove	4 25@4 50	Lingan	4 50
Cumberland	4 75@5 00	Pictou	5 00
Clearfield	4 50	Penn	5 50
Westmoreland	6 00	Youghiogheny	4 50@5 50
Caledonia	4 00		

—*Commercial Bulletin.*

Chicago, Ill. Sept. 25, 1877.

Specially reported by Messrs. RENO & LITTLE.

The following are the retail prices of coal delivered:

Lackawanna Stove	$6 75	Erie and Brier Hill	$5 50
" Chestnut	6 75	Wilmington and Ill.	3 50@4 00
" Grate	6 75	Blossburgh	6 50
" Egg	6 50	Piedmont	7 50

Cincinnati, O. Sept 25, 1877.

Specially reported by the Consolidated Coal and Mining Co.

	AFLOAT. Per bush.	AFLOAT. per ton 2,000 lb.	DELIVERED. Per bush.	DELIVERED. per ton 2 000 lb.
Youghiogheny lump	7c.	$1 94	10c.	....
" nut	5½c.	1 53	9c.	....
" slack	4½c.	1 25	8c.	....
Camden, W. Va	5½c.	1 53	9c.	....
Peytona Cannel	16c.	4 57	20c.	....
Connellsville coke	7c.	3 ..	10c.	....
Youghiogheny coke	5c.	2 64	c.	....
Crushed coke	..	....	1.c.	....

Anthracite, Wilkes-Barre or Lehigh by car load.....
" " " delivered..7 00@7 50

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes)	$7 50 per ton
Lehigh, retail	8 50 per ton

Hamilton, Ont. Sept. 24, 1877.

Specially reported by H. BARNARD.

I beg to hand you state of our market corrected to date.

Grate	$5 25	Lehigh Lump	$6 00
Egg	5 25	Brier Hill	5 50
Stove	5 25	Massillon	4 50
Nut	5 25	Blossburgh	6 00

Cleveland, O. Sept 25, 1877.

Specially reported by Messrs. LAMBIE & BATES.

Per ton of 2000 lbs. f. o. b. vessels.

WHOLESALE.

Brier Hill (Church Hill)	3 50
" " No. 2 Grades	3 35@3 40
Straitsville Lower Vein	2 80
Hocking Valley	2 80
Massillon	2 85
Mineral Ridge (Cambria Mine)	2 85
Tuscarawas Valley	2 30
Columbiana	2 30
Nut coal, various grades	2 20@2 50
Screenings, "	1 35@1 75
Youghiogheny gas coals	3 75@3 85

The following are the prices established by the Coal Exchange until further notice:

RETAIL TRADE.

	1 to 10 tons, upw'd.	10 tons.
Brier Hill lump	$4 25	$4 00
" " nut	3 75	3 50
Massillon and Mineral Ridge lump	4 00	3 70
" " " nut	3 75	3 55
Straitsville Lower Vein, Hocking & Shawnee, l'p	3 60	3 35
" " " nut	3 40	3 15
Del Carbo lump	3 75	3 50
" " nut	3 50	3 25
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 00	7 25

Lehigh $1 25 per ton higher.
All sales to be strictly cash with order or C. O. D.

Indianapolis, Ind. Sept. 24, 1877.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers

BITUMINOUS.

White River, per ton	$ 2 50	Peytona Cannel, per ton	$ 5 75
Brazil Block, "	2 25	Indiana Cannel	4 50
Highland, grate, "	2 00	Hocking Valley	4 25
Block coal, nut, per car	18 00	Youghiogheny	4 50
Highland " "	18 00	Blossburg (smithing)	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas Cake, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre).

Broken	$7 60	Nut	$6 70
Egg	7 60	Stove	6 70

Lehigh Anthracite.

Broken	$7 60	Nut	$7 30
Egg	7 60	Stove	7 70

Retail, per bushel, delivered.

Sand Creek	13c.	Block Nut, steam	8c.
White River	13	" Slack, "	0
Brazil Block	13	Virginia Cannel	27
Highland Grate	11	Youghiogheny	16
Block Nut, domestic use.	11	Blossburg	26
Highland Nut, " "	11	Piedmont	26
" " steam	8		

GAS COKE (measured.)

Crushed	14c.	Lump	12c.

Louisville, Ky. Sept. 26, 1877.

Specially reported by Messrs. BYRNES & SPEED.

Below find latest quotations:

WHOLESALE.

Pittsburg	11c. per bush.	Kentucky nut	8@9c. per bush.
Raymond City	— "	Kentucky	8c. "

RETAIL.

Pittsburg	14c. per bush.	Pine Hill	12c. per bush.
Raymond City	13c. "	Kentucky	10 to 11c "
Indiana Cannel	17c. "	Anthracite	$7 50 per ton.
City Make Coke.	9c. "		

Montreal. Sept. 25, 1877.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per 2,000 lb. ex ship.

Scotch Steam	$2 75	Cape Breton Steam	$3 25
Pictou	3 75	Newcastle Smiths	5 50

Anthracite at retail. per 2,000 lb. delivered.

Egg	$6 25	Chestnut	$5 75
Stove	5 75		

Milwaukee, Wis. Sept. 24, 1877.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail price per ton of 2,000 lb.

Trade is not much to boast of, still doing something. I hope that this year if not bringing immediate relief may put us in line for a good trade next year.

Anthracite, egg, chestnut, and stove	$6 50		
Lehigh lump	$7 00	Connellsville coke on RR. track	$7 25
Briar Hill	$5 25	Straitsville	4 80

New Orleans, La. Sept. 22, 1877.

Specially reported by Messrs. C. A. MILTENBERGER & Co.

PITTSBURG COAL.

At wholesale (by boat load)	40c. per bbl.
To steamboats	50c. "
" manufactories	50c. "
" families	60c. "
In hhds. (for shipment)	$5 50 per hhd.

ANTHRACITE COAL.

At wholesale	$7 00 to 8 00 per ton.
" retail	10 00 to 11 00 "

VIRGINIA CANNEL COAL.

At retail	$1 25 per bbl.

ST. BERNARD (KY.) COAL.

To steamboats	45c. "
" families	55c. "

Philadelphia. Sept. 27, 1877.

Specially Reported.

Prices of Schuylkill for the city and line trade have been fixed as follows for October: Lump and Steamboat, $2.00; Broken and Egg, $2.25; Stove, $2.50; Chestnut, $2.00; Pea, 90c. Compared to September rates it is an advance of 15c. on Broken and Egg; 25c. on Stove; 20c. on Chestnut. The above prices are at Schuylkill Haven. The advance on Stove at mines since July is 75c., making $1.00 advance to the dealer, with the advance in tolls of the latter part of August of 25c. There has been no corresponding advance in Lehigh Coal. The dealers are full of coal and are shy of buying at the advance, fearing a decline later and they prefer to run out the bulk of the coal on hand before making new purchases. If the weather should become colder and consumers come in freely the new rates would soon become established, but there are many who do not look for an active trade this fall. The forced activity of this summer, due to the extremely low prices, has been no doubt at the cost of a good deal of the fall trade, and October, which has always been an active month, is not likely to be so this year, certainly not to the extent it was formerly.

Vessels have been scarce for a few days past, but there is yet no change in freights. The East has to take a good deal of coal yet and will likely have to pay higher rates of freight for a good deal of it.

Pittston, Pa. Sept. 25, 1877.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb. Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional

Richmond, Va. Sept. 25, 1877.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2,240 lb., f. o. b.

Kanawha Cannel	$9 00	New River Bituminous	$3 30
Coalburg Splint	5 70	Clover Hill Coal	3 00
Lewiston "	5 70	James River Bitum	3 50
Kanawha Gas Coal	4 90	" " Carbonite	5 25

Sandusky, O. Sept. 26, 1877.

Specially reported by C. E. BLACK, Agt. Con. Coal & Mg. Co.

We quote coal on cars at Sandusky, as follows:

Per ton of 2,000 lbs.

Anthracite.

	Grate.	Egg.	Stove.	Chestnut
Wilkes-Barre	$4 80	$4 80	$4 80	$4 80
Lackawanna	4 80	4 80	4 80	4 80
Lehigh	5 80	5 80	5 80	5 80

Bituminous.

Massillon	$2 90	Straitsville	$2 65
Del Carbo	2 65	Shawnee	2 65
Hocking Valley	2 65	Blossburg	4 75

Prices f. o. b. vessel for soft coal, 15c. advance on car prices. Prices retailed delivered 50c. above car prices.

St. Louis, Mo. Sept 25, 1877.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracit Coal Association.

Retail prices, delivered. Ton of 2,000 lb.

ANTHRACITE. per ton.

Lackawanna	$8 00@8 50	Schuykill	8 00@ 8 50
Wilkes-Barre	8 00@8 50	Lehigh	9 00@ 9 50

BITUMINOUS.

Blossburg	9 00	Big Muddy	3 00
Pittsburg	4 50	Illinois Coals	2 50@3 00
Indiana Block	4 00	Connellsville Coke.	6 50

San Francisco, Cal.

From the *Commercial Herald* of Sept. 20, 1877.

COAL—Imports from January 1 to Sept. 1:

	Tons.		Tons.
Anthracite	10,045	Vancouver Island	66,389
Australian	46,644	Rocky Mountain	113
Coos Bay	21,699	Saghalien	40
Cumberland	7,900	Seattle	73,402
English	58,974	Bellingham Bay	8,100
Chili	6,513	Ione, Cal.	1,805
Mt. Diablo,	39,995		

Arrivals continue numerous, thus adding largely to our stocks in yard. Prices of all kinds are low and nominal, and it is with very great difficulty that cargo sales can be made at any price at all satisfactory to the importer. There is at date much less English Steam, etc., en route unsold than usual; yet we see little hope for improvement by reason of the steadily increased product of the Seattle mines, holders of which are determined to sell, and, as far as possible, to control the market. The ship *Western Shore* brought 2,050 tons Seattle, *Osmyn* 800 tons, etc. From British Columbia we have the French brig *Deux Amis* with 680 tons Wellington, ship *Revere* with 1,250 tons same, *War Hawk* with 1,480 tons Nanaimo, *Glenrosa* with 1,244 tons Sydney, the British shig *Mitredale* with 1,773 tons Wallsend from Newcastle, N. S. W. In the absence of reported sales it is difficult to give correct quotations, but it is fair to say that coast Coals can be bought at $5@5.50 for screenings, and for coarse $7@$7.50 in cargo lots; Australian, $8@8.50; English Steam, $6.75@7. The ship *Salamanca*, from Liverpool, brought 938 tons Coal and 100 tons Coke. The cargo of Sydney per *Mitredale*, 1,773 tons, sold on private terms, but said to be $8.

Toledo, Ohio. Sept. 25, 1877.

Specially reported by Messrs. GOSLINE & BARBOUR

We report prices of coal on cars at Toledo as follows:

Ton of 2,000 lb.

Straitsville lump	$2 70	Hocking Valley nut	2 30
" nut	2 30	Massillon lump.	3 00
Shawnee lump	2 70	Cumberland	5 40
" nut	2 30	Blossburg	5 40
Hocking Valley lump	2 70		

Prices of hard coal on cars at Toledo are as follows:

	Grate.	Egg.	Stove.	Chestnut
Pittston	$5 35	$5 35	$5 60	$5 50
Wilkes-Barre	5 35	5 35	5 60	5 50
Lackawanna	5 35	5 35	5 60	5 50
Lehigh	5 95	5 95	6 20	6 10

For retail delivery in city the prices are as follows: Stove and chestnut $6.25; grate and egg, $6.00 per ton; Lehigh, 75c per ton additional.

Prices soft coal f. o. b. vessel for Lake shipments will be from 15 to 20c. per ton more than prices on cars.

Lake Freights on Coal.

The rates given below represent the latest actual charters.

From Buffalo to Chicago	0.30
" " to Milwaukee	0.30
" " to Duluth	0.60
" " " Toledo, O	0.20
" " " Detroit	0.20
From Cleveland to Chicago	0.40
" " " Milwaukee	0.40
" " " Bay City	0.50
" " " Detroit	0.30
" " " Racine	0.50
From Black River to Milwaukee	0.40
" " " Buffalo	0.40
From Sandusky to Chicago	0.50
" Oswego, N.Y., to Milwaukee	0.60
" " " Chicago	0.65
From Fair Haven to New York	0.60

Rates of Toll

For the above we refer to our issue Sept. 8.

For freights on coal *via Geneva, Ithaca and Sayre Railroad* we refer to our issue of Sept. 8.

For freights on *Pennsylvania & New York Railroad* we refer to our issue of Sept. 8.

For freights on *Lehigh and Wyoming Coal* we refer to our issue of Sept. 15.

For freights on *Schuylkill Coals* we refer to our issue of Sept. 15.

Freights on Bituminous Coals from the Mines to Tide Water Shipping Ports.

For the above see issue of Sept. 15.

Towing.

For above rates see our issue of Sept. 22.

Freights

Representing the latest actual charters up to Sept. 27. Per ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me.	....	....	....	1 50
Albany	95	....	....	....
Alexandria, Va	72½	....	....	....
Annapolis, Md.	....	....	....	....
Bangor, Me.	1 50	....	....	90
Bath, Me.	....	....	....	1 00
Baltimore	65	....	....	....
Boston, Mass.	125@140	....	....	90
Bridgeport, Ct.	....	....	....	50
Bristol, R. I.	....	....	....	80
Beverly, Mass.	....	....	....	1 00
Cambridgeport, Mass.	1 28	....	....	90
Charleston, S. C.	1 05	....	....	....
Danversport, Mass.	1 38	....	....	....
East Greenwich, R. I.	....	....	....	....
Fredericksburg, Va.	1 25	....	....	....
Fall River	1 15	....	....	80
Gloucester	1 75	....	....	....
Hackensack, N.J.	1 11	....	....	.
Hartford, Conn.	1 50	....	....	....
Hoboken	....	....	....	35
Ipswich, Mass.	1 60	....	....	....
Jersey City	....	....	....	35
Lynn, Mass.	1 45	....	....	....
Medford, Mass.	....	....	....	....
Middletown	....	....	....	....
Marblehead, Mass.	....	....	....	....
Nantucket, Mass.	1 45	....	....	80
New Bedford	115@120	....	....	80
Newburyport	1 35	....	....	1 00
New Haven	....	....	....	50
New London	....	....	....	....
Newport	....	....	....	80
New York	95	....	....	35
Norfolk	75	....	....	75
Norwalk	....	....	....	50
Norwich	1 20	....	....	....
Pawtucket	125@130	....	....	9c
Philadelphia	....	....	....	....
Portland	110@130	....	....	90
Portsmouth, N. H.	....	....	....	....
Providence	1 15	....	....	....
Petersburg, Va.	....	....	....	....
Quincy Point, Mass.	1 25	....	....	....
Richmond, Va.	80	....	....	....
Saco	....	....	....	90
Salem, Mass.	....	....	....	....
Saugus, Mass.	1 40	....	....	....
St. John, N.B.	....	....	....	....
Somerset, Mass.	1 15	....	....	....
Troy	....	....	....	....
Trenton, N.J.	....	....	....	....
Washington	70@75	....	....	....
Wilmington, N.C.	....	....	....	....
Weymouth, Mass.	....	....	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Sept. 28, 1877.

American Pig.—We only hear of sales of 700 tons of Allentown on private terms, between 600 and 700 tons of North River No. 1 foundry, said to be at $17.50, prompt cash, and sundry lots of various brands in 50 and 100 ton lots, at our quotations. Although the business of the week has not been so large as that of the previous one, yet it wears an encouraging look. The majority of the best brands of iron are very scarce and quite firm. The North River irons appear to be the demoralizing element in the market. We hear rumors of the intention to blow in several more furnaces. Such an event would undoubtedly cause a decline in prices to a point lower than at present. We cannot see that the time has yet come for increasing our present make. We quote No. 1 foundry at $18@19; No. 2 foundry, $17@18; and forge, $16@17.

Scotch Pig.—We note arrivals of 400 tons during the week, part of which has been sold from dock. We quote Coltness, $26@26.50; Eglinton, $24.50 @25, and Glengarnock, $24.75.

Rails.—We are reported sales of steel rails aggregating 1,250 tons on private terms. There is a fair inquiry for immediate delivery, while there is reported to be a strong demand for next year's delivery at present prices. Makers, however, are not inclined to sell ahead at present prices. We quote iron rails at mills at $33@38, and steel at $42@45.

Old Rails.—Without business we quote nominally at $18@19.

Scrap.—We have nothing to report in wrought and quote at $22@23.

Baltimore, Md. Sept. 24, 1877.

Specially reported by Messrs. R. C. HOFFMAN & Co.

We note quite an improvement in the iron market during the past week. There has been more inquiry for good grades white iron and larger transactions than we have had for many months past.

Baltimore Charcoal	$29@31	Mottled and White	$15@16 00
Virginia Charcoal	28@31	Charcoal C. B. Blooms	50@55 00
Anthracite No. 1	19@20	" " Billetts	55@60 00
" " 2	18@19	Refined Blooms	45@50 00
Anthracite No. 3	17@18		

Boston. Sept. 22, 1877.

Pig continues to meet with an improved demand, both here and in New York. We quote, $21.50 for No. 1; $20@20.50 for No. 2, and $19.50@20 for gray forge. Scotch pig is as dull as ever.

Bar continues unchanged, quoting $43@45 for refined, and $35@36 for common. Nails are in light demand at unchanged prices. Sheet is selling at 3@3¼c. per pound. Russia is quiet at 12c. currency. We quote, English spring steel at 7@8c. gold; 9@11c. for German; 9@11c. for machinery; 14@16c. for cast; 10@12c. for blister; 8c. for American spring; 13¼@14c. for cast, 9c. for blister, and 8c. for machine.—*Commercial Bulletin.*

Buffalo. Sept. 24, 1877.

Specially reported by PALEN & BURNS.

No. 1 Ex Foundry	$20 75
No. 2 "	19 75
Gray forge	18 75
American Scotch A 1 Foundry	25 00
Cherry Valley B 1 "	24 00
" " No. 2 "	23 00

Chattanooga, Tenn., Sept. 25, 1877.

Specially reported by J. F. JAMES, dealer in pig iron, ores, etc.

PIG IRON.—The market here may be considered as almost lifeless, as I have no sales of importance to report and hear of no shipments of metal from the furnaces below. Prices are very weak, and offers at far below market rates have been made to purchasers, but declined. My aggregate sales to foundries South and Southwest for the past week in car load lots, 70 tons, the smallest weekly shipment since my establishment of this market, three years ago. Prospects for any improvement not at all encouraging.

BAR IRON, RAILS, CAR WHEELS, and SCRAP unchanged in demand and prices.

Tenn., Ala. and Ga. Charcoal, No. 1 Foundry	$18 00@19 00		
Tenn., Ala. and Ga. Charcoal, No. 2 Foundry	17 00@18 00		
Tenn., Ala. and Ga. Charcoal, Gray Forge	15 00@16 00		
Tenn., Ala. and Ga. Coke, No. 1 Foundry	19 00@20 00		
Tenn., Ala. and Ga. Coke, No. 2 Foundry	17 00@18 00		
Tenn., Ala. and Ga. Coke, Gray Forge	15 00@16 00		
Charcoal or Coke, white and mottled	14 00@15 00		
Tenn., Ala. and Ga. Cold Blast (car wheel)	22 00@28 00		
Old rails	18 00@19 00	Wrought scrap,	
Old car wheels	16 00@17 00	No. 2	12 00
Wrought scrap,		Cast scrap	10 00
No. 1	17 00	Muck bar	32 00@33 00

Iron Ores.

Red Hematite (about 55 per cent. metallic iron) f. o. c. at mines	1 25
Brown Hematite (about 55 per cent. metallic iron)	1 75

Cleveland, O. Sept. 22, 1877.

Specially reported by Messrs. C. E. BINGHAM & Co.

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, L. S. Charcoal	$25 00	Am. S., No. 1, Ch Val.	$23 00
No. 2, " " "	25 00	" " B. 1, " "	22 00
No. 1, Anthracite	23 00	" " No. 2, " "	20 00
No. 2, "	21 00	No. 1, Massillon	23 00
No. 1, Bituminous	23 00	B—1, "	22 00
No. 2, "	21 00	No. 2, "	20 00

CAR WHEEL AND MALLEABLE IRON.

No. 3 L. S. Charcoal	26 00	No. 5 & 6, L. S. Charcoal	$27 00
No. 4, " " "	26 00		

BESSEMER IRON.

Nos. 1 & 2, L. S. Char.	$25 00

FORGE IRON.

No. 1, Gray	$19 00	White and Mottled	$18 00

Cincinnati, O. Sept. 25, 1877.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

Below please find closing quotations of our pig iron market.

CHARCOAL.

Hanging Rock No. 1 Foundry B 1	$23 00@23 50	—4 mos
" " No. 2 "	22 00@	—4 mos
" " Soft Silver Gray	21 00@22 00	—4 mos
" " Mill	18 00@20 00	—4 mos
Tennessee, No. 1 Foundry	23 00@	—4 mos
" " 2 "	21 00@	—4 mos
" " Mill,	19 00@	—4 mos

STONE COAL.

Ohio, No. 1 Foundry	20 00@20 50	—4 mos
" " 2 "	19 00@19 50	—4 mos
" " 3 "	18 00@18 50	—4 mos
" Mill	18 00@18 50	—4 mos

COKE.

Ohio & W. Va. No. 1 Foundry	22 00@	—4 mos
" " 2 "	21 00@	—4 mos
" " Mill	18 00@19 00	—4 mos

CAR-WHEEL.

Hanging Rock, C. B.	Hecla, Vesuvius, Jefferson, Etna.	40 00@	—4 mos
Maryland,	" Amherst & Cedar Pt.	38 00@	—4 mos
Missouri,	" Maramec	33 00@	—4 mos
Alabama,	" Woodstock	32 00@	—4 mos

BLOOMS.

Charcoal	45 00@50 00—cash.

SCRAP IRON.

Cast	40c.@ 55c.— "
Wrought	62c.@ 1 00— "

Louisville, Ky. Sept. 25, 1877.

Specially reported by Messrs. GEORGE H. HULL & Co.

Business in all grades of pig metal active, but so far it has not had the effect to raise prices. The usual time, four months, is allowed on the quotations below.

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	$23 00@24 00
No. 2 " " "	20 00@21 00
No. 1 Southern Charcoal	20 00@21 00
No. 2 " "	19 00@20 00
No. 1 Hanging Rock, Stonecoal and Coke	20 00@22 00
No. 2 " " " " "	19 00@20 00
No. 1 Southern Stonecoal and Coke	19 00@20 00
No. 2 " " " "	18 00@19 00
"American Scotch"	20 00@22 00
Silver Gray	18 00@19 00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neutral	18 50@19 50
No. 1 Stonecoal and Coke, Cold-short and Neutral	18 00@18 50
No. 2 " " " " " "	17 50@18 00
No. 1 Missouri and Indiana Red-short	21 00@22 00
White and Mottled, Cold-short and Neutral	15 00@16 00

CAR-WHEEL AND MALLEABLE IRON.

Hanging Rock, and Cold Blast	34 00@38 00
Alabama and Georgia "	22 00@33 00
Kentucky Cold-blast	25 00@33 00

Montreal. Sept. 18, 1877.

We quote: Pig iron—Eglinton and Clyde, $18 to $18.50. American, $20 to $21; Summerlee, $18.50 to $19; Gartsherrie, $19.25 to $19.50; Hematite, $24 to $26. Bars per 100 lb.: Scotch and Staffordshire, $1.85 to $1.90; best do., $2.10 to $2.15; Swedes and Norway, $4.75 to $5; Lowmoor and Bowling, $6 to $6.50.—*Monetary Times.*

Milwaukee, Wis. Sept. 24, 1877.

Specially reported by Messrs. R. P. ELMORE & Co.

Wholesale Price.

Charcoal Iron.

No. 1 Lake Superior per gross ton	$25 00—4 mos.
No. 2 " " " "	24 00—4 mos.

Anthracite Iron.

No. 1 anthracite per gross ton	$25 00—4 mos.
No. 2 " " "	24 00—4 mos.

Stone Coal & Coke.

Wholesale Price.

Warner's Am. Sc'th (Bk. Bend) per ton	$25 00@ —4 mos.
Soft Silvery per ton	22 00@23 00—4 mos
Lake Superior and Lake Champlain ores	24 00@25 00—4 mos.
Sharpsville (Penn.) native ores	24 00@25 00—4 mos

Car Wheel.

Lake Superior ores per ton	$25 00@27 00—4 mos

Philadelphia, Pa.

[Weekly Report of the Philadelphia Iron Market, furnished for THE ENGINEERING AND MINING JOURNAL, by JUSTICE COX, Jr., & Co., Iron Merchants, 323 Walnut Street, Philadelphia, Week ending Sept. 27, 1877.]

PIG IRON.—There are two or three sales of 1,000 ton lots reported this week, with the usual small sales. The market is hardly as firm as at our last, the talk of several furnaces about to blow in has made consumers feel prices will not advance for the present. We report sales of about 3,000 tons, and quote No. 1, $18.50@20; No. 2, $17.50@19; No. 3, or gray forge, $16.50@20, as to brand and delivery.

MANUFACTURED IRON.—The bar trade is as it has been for months, dull and depressed; few sales and low prices are the rule. With plate, a little more inquiry, with nothing large reported. In tank, the orders continue in a small way, with nothing large reported. Skelp continues dull, some mills are working on old orders; nothing new reported. We quote, bars, 2@2 1-10c. per lb.; plate and tank, 2½@7c. per lb.; skelp, 2 1-10@2¼c. per lb.

RAILS.—We hear of nothing new in steel rails, whilst iron rails are quite in demand, several large inquiries are on the market. We quote steel $45 to $47, iron $33 to $36, all at mill.

OLD RAILS.—There is some inquiry for old rails, hence the stiffening of prices. The lots sold last month could be sold at a profit now. We quote $19 to $20.

OLD WHEELS.—The demand for old wheels continues in a small way; no large sales being reported. We quote $18.50 to $20.

SCRAP.—Wrought scrap is in plentiful supply and quoted at $20 to $25; cast is quite dull at $14 to $19.

Pittsburgh, Pa. Sept. 25, 1877.

Specially reported by A. H. CHILDS.

4 mos.		4 mos.	
No. 1 F'dry	$22 00@24 00	Mottled & White	$16 00@17 50
" 2 "	20 00@22 00	Hot blast C'coal	21 00@28 00
Gray Forge	18 00@20 50	Cold " Western	—@40 00

Richmond, Va. Sept. 26, 1877.

Specially reported by ASA SNYDER, Esq.

This market is firm at quotations for all descriptions of pig iron. General foundry grades are most in demand.

Virginia Cold Blast Charcoal Pig Iron, cold short		$20 to $26	
" " " " " " neutral		28 to 31	
" Warm " " " "		20 to 25	
" Anthracite 1 X		20 to 22	
" " 2 X		19 to 21	
" " 3		18 to 19	
" " Coke West Va. 1 X		22 to 23	
	2 X	21 to 22	

San Francisco, Cal.

From the *Commercial Herald* of Sept. 20, 1877.

The arrivals of pig iron, etc., continue free, causing large stock accumulations and a dull market at merely nominal rates. The ship *Salamanca*, from Liverpool, brought 200 tons of pig iron, and the ship *America*, from New York, 198 tons same. The steamship *City or Panama* carried en route to New York, via the Isthmus, 792 pigs of lead, weighing 65,301 lb., valued at $3,500. Tin plate is very plentiful and cheap. Coke, 10X14 and 14X20, may be quoted at $6.50@6.75; Charcoal tin, same sizes, $8; Sydney pig tin, 16½c. The *Oceanic*, from Hongkong, brought 93 pigs Banca tin.

St. Louis, Mo. Sept. 24, 1877.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

We note no particular change in the condition of our market. Trade continues good and prices remain firm at quotations.

COLD BLAST CHARCOAL—ALL NUMBERS.

Hanging Rock	25@38	Assorted Bar Iron	$2, rates.
Tennessee	26@30	No. 1 Wrought Scrap	80c. cwt.
Kentucky	26@30	Heavy cast "	65 "
Missouri	26@30	Light " "	55 "
Georgia	26@30	Old rails	19 00 to 20 00
Alabama	26@30	Old car wheels	17 00 to 18 00

	No. 1.	No. 2.	Mill.	White and Mottl'd.
Missouri stone coal	$22 00	$21 00	$20 00	19 00
" charcoal	22 00	21 00	20 00	20 00
Tennessee charcoal	22 50	21 00	20 00	19 00
Tenn. coke very soft and strong	23 00	21 00	20 00	18 50
Hanging Rock charcoal	25 00	24 00	23 00	.....
" " cold short	24 00	23 00	.....	.....
	Ex No. 1	No. 1.	B No. 1.	No. 2.
Alice Hanging Rock coke	$25 00	$24 50	$24 00	$22 00
Quinnimount, W. Va., coke	23 50	23 00	22 00	21 50

METALS.

NEW YORK, FRIDAY EVENING, Sept. 28, 1877.

The business of the week has been far less than during the previous one, although prices have been fairly maintained.

Gold Coin.—During the week under review, the price of gold has ranged from 103¼ to 103, and closed at 103.

Bullion.—In consequence of the proposed new Indian loan of £3,000,000, and the announced determination of the German Government not to sell below 55⅛d. (as we understand it, although it has been published at 54⅛d.) Silver has advanced in London to 55d. on spot, and 54⅞d. to arrive, and the market is very firm. The German Government has been a heavy seller quite regularly each week—as much as three and one-third millions of dollars week before last—but for which, on account of the Indian demand and our utilization of pretty nearly all our own production, we would have seen silver at least 5 per cent. higher. We quote in this market 119 per oz., and in San Francisco 8 per cent. discount. Gold is quoted ⅛@¼ per cent. premium.

Daily Range of Silver in London and New York per oz

Date.	London. Pence	New York. Cents	Date.	London. Pence	New York. Cents
Sept. 22	54½	118½	Sept. 26	54 11/16	118½
" 24	54 11/16	118⅝	" 27	54⅝	119
" 25	54⅝	118⅝	" 28	55	119

The Nevada Bank Silver Sales.—The Sacramento *Daily Record Union* of the 17th inst. says: "The Nevada Bank of San Francisco has sold 300,000 ounces of fine silver for shipment to China by the next steamer. This makes over 2,000,000 ounces sold by this bank in the past ten days."

Surplus Silver in Germany.—No official returns have been made in the amount of silver sold by the German Government since the demonetization of that metal. The Berlin *BorzenZeitung* calculates that the withdrawals of old silver from circulation from Germany have been at the following rates: To the end of 1874, £7,447,000; in 1875, £10,878,000; in the first half of 1876, £6,670,000; in the second half, £8,651,000; and in the first half of this year, £7,295,000—altogether, £40,941,000. Of this total it is known that half, or £20,000,000 has been recoined, and the other half has partly been sold, and partly remains for sale.

Copper.—The business of the past week has not amounted to more than 200,000 lb. at 18⅜@18½c. The market closes weak at the lower quotation. Manufacturers are reporting a much better business. The latest London cable was Chili Bars £66, and Best Selected £74, a decline of £1 on the former, and 10s. on the latter.

Tin.—The Banca sale is telegraphed to have averaged 40¼ f., equal to £68.10s. in London. Straits in London to-day is quoted at £66, and English common at £69. Our market has been very quiet, although prices had a steady rising tendency. We quote, Straits, 16c.: L. & F., 15¼c.; Refined, 15½c.@15⅝c.; and Banca, 18c.

Tin Plates.—These have also been quiet, and although prices are nominally unchanged, yet there is an inclination to shade. We quote, in gold, per box, as follows: Charcoal tins, $6.55@6.62½, and ternes, $6.12½; coke tins, $5.70, and ternes, $5.50@5.62½.

Messrs. Robt. Crooks & Co., of Liverpool, under date of Sept. 13, say of tin and terne plates: "Coke tins are at last showing sympathy with other grades, and losing ground. Many makers have, for these, dropped their quotations 6d. per box during the past week, and the probability is, that in a few days, some outside brands may be procurable at even under figures indicated. Charcoal tins are as they were, that is, at the lowest point touched. Ternes are somewhat weaker, but make being very limited prices are hardly quotably lower."

COAL TRANSPORTATION AND GENERAL MINING STOCKS.

Name and Location of Company.		Feet on Vein.	Capital Stock	Shares		Assessments.				Dividends.					Highest and Lowest Quotations per Share in Currency.										Sales.
				No.	Par Val.	Total levied to date.	Date and amount per share of last.			Total paid to date.	Last Dividend.			Rate per Ann.	Sept. 22.		Sept. 24.		Sept. 25.		Sept. 26.		Sept. 27		Sept. 28.		
															H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Coal Stocks.			$			$	Mo.	Yr.	Amt.	$	Mo.	Yr.	Amt.	Per cent.												
Consol. Coal	Md.	....	10,250,000	102,500	$100	*	.....	.....	.....	....	Jan..	1877	2½	10	..	..	..	..	..	..	..	..	..	..	21	....
Del. & H. Canal	Pa.	....	20,000,000	200,000	100	*	.....	.....	.....	38,821,104	Aug.	1876	4	8	48½	47⅝	48	46	47½	43½	44⅞	42¾	43½	40¼	41¾	39¼	40,345
Del., Lac. & W. RR.	Pa.	...	26,200,000	524,000	50	*	.....	.....	.....	....	July	1876	2½	5	51¾	50¾	51½	49½	50⅞	48¼	49¼	47½	47⅜	45⅜	46¼	43⅝	247,595
Lehigh C. & N.	Pa.	....	10,448,550	208,971	50	*	.....	.....	.....	.. ..	Sep.	1876	1½	6	..	..	19¾	19½	..	..	19¾	19½	19⅜	19	18⅞	18⅝	947
Lehigh Valley RR.	Pa.	....	27,042,900	540,858	50	*	.....	.....	.....	....	Apr.	1877	1½	6	39⅞	39½	40¼	39½	41	40¼	43	40¾	40½	40	39½	39	4,481
Maryland Coal	Md.	....	4,600,000	44,000	100	*	.....	.....	.....	....	Jan..	1876	1½	1½	..	..	..	..	..	..	..	..	..	..	..	..	....
N. J. Central RR.	Pa.	....	20,600,000	206,000	100	*	.....	.....	.....	....	Apr.	1876	2½	10	..	..	..	..	17⅛	17⅛	17	17	17	16	16¼	14¾	1,733
Penna. Coal	Pa.	....	5,000,000	100,000	50	*	.....	.....	.....	....	Aug.	1877	3	12	..	..	..	..	..	..	..	..	..	..	..	..	....
Pennsylvania RR.	Pa.	....	68,868,700	1,377,376	50	*	.....	.....	.....	....	May.	1877	1¼	6	29½	29	29	28⅝	29⅜	28¾	29⅜	29	29	28¼	28⅞	28¼	42,049
Phil. & Read. RR.	Pa.	....	34,278,755	685,575	50	*	.....	.....	.....	....	Jan..	1876	2½	10	17	16½	16⅜	16⅛	17	16⅜	17	16⅜	16¼	16	15⅜	15½	13,936
General Mining Stocks																										
Alpha Cons. G. S.	Nev.	300	3,000,000	30,000	100	210,000	Aug.	1877	$1 00	....	.....	.....	.....	..	..	..	..	..	..	..	14¾	..	14½	..	14⅝	..	300
Am. Flag, G.	Colo.	5,300	600,000	60,000	10	*	.....	.....	.....	....	.....	.....	.....	..	11c	10c	10c	..	..	..	11c	10c	9c	..	..	..	3,700
Belcher, G. S.	Nev.	1,040	10,400,000	104,000	100	968,400	July	1877	1 00	15,397,200	Apr.	1876	$1 00	12	..	..	..	..	..	..	..	..	..	..	..	..	3,700
Bertha & Edith G.	Vir.	645 acs.	3,500,000	350,000	10	*	.....	.....	.....	....	.....	.....	.....	..	72c	60c	55c	50c	35c	30c	34c	31c	32c	31c	32c	29c	24,080
Best and Belcher, G. S.	Nev.	545	10,080,000	100,800	100	337,792	Aug.	1877	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Bobtail, G.	Colo.	2,500	1 136,630	227,326	5	*	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Bobtail Tunnel, G.	Colo.	....	100,000	20,000	5	6,000	July	1873	0 30	20,000	Dec..	1876	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Bullion, G. S.	Nev.	943⅓	10,000,000	100,000	100	2,552,000	June	1877	1 50	....	.....	.....	.....	..	8¼	..	..	..	8½	..	8½	..	8¾	8⅝	8¾	..	800
Caledonia, G. S.	Nev.	2,188	10,000,000	100,000	100	1,360,000	June	1877	50	....	.....	.....	.....	..	..	..	4	..	4	..	..	..	..	..	..	..	300
California, G. S.	Nev.	600	54,000,000	540,000	100	....	.....	.....	.....	18,360,000	Sept	1877	2 00	24	..	..	..	..	..	..	..	..	..	..	..	..	....
Chollar Potosi, G. S.	Nev.	1,400	2,800,000	28,000	100	1,412,000	July	1877	3 00	3,080,000	Feb.	1872	1 00	12	..	..	..	..	..	..	..	..	38¼	..	..	..	100
Cleveland, G.	Colo.	3,715	250,000	25,000	10	*	.....	.....	.....	....	.....	.....	.....	..	..	..	6⅝	6½	..	..	..	..	..	..	..	..	....
Cons. Hercules & Roe.	Colo.	16,500	1,000,000	100,000	10	*	.....	.....	.....	120,000	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	300
Cons. Imperial, G. S.	Nev.	468	50,000,000	500,000	100	475,000	May.	1877	0 20	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Con. N. Slope & E. C. T.	Colo.	15,000	500,000	10,000	50	*	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Cons. Virginia, G. S.	Nev.	710	54,000,000	540,000	100	474,600	June	1873	3 00	32,400,000	Sept.	1877	2 00	24	..	..	..	..	..	..	..	..	..	..	..	..	....
Confidence, G. S.	Nev.	130	2,496,000	24,960	100	243,840	Mar.	1873	1 00	78,000	May.	1865	8 ⅓	..	5	..	..	..	..	..	..	..	5¾	5½	5½	..	700
Crown Point, G. S.	Nev.	600	10,000,000	100,000	100	1,573,370	Sept.	1877	1 00	11,588,000	Jan..	1875	2 00	24	..	..	..	..	..	..	..	..	..	..	..	..	....
Douglas	Colo.	21,000	1,000,000	10,000	100	*	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Eureka Cons. G. S. L.	Nev.	..	5,000,000	50,000	100	100,000	May	1876	1 00	1,000,000	Aug.	1875	1 00	..	46½	..	45	..	44⅜	..	..	..	47	..	..	..	....
Eureka G. Mg. G.	Cal'f	....	2,000,000	20,000	100	....	.....	.....	.....	2,134,000	Aug.	1877	2 00	..	..	..	..	..	..	..	..	..	..	..	..	..	600
Exchequer, G. S.	Nev.	400	10,000,000	100,000	100	280,000	Sept.	1876	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	9	..	9⅛	..	9¼	..	....
Gould and Curry, G. S.	Nev.	621	10,800,000	108,000	100	2,332,000	Aug.	1877	1 00	3,934,800	Oct..	1870	10 00	..	..	..	..	..	..	..	..	..	..	..	..	..	4,400
Granville Gold	N. C.	9,000	1,000,000	100,000	10	*	.....	.....	0 50	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Hale & Norcross, G. S.	Nev.	400	11,200,000	112,000	100	2,522,000	Aug	1877	0 50	1,598,000	Apr.	1871	1 00	12	..	..	..	..	..	..	..	..	..	..	..	..	....
Henry Tunnel	Nev.	3,000	2,000,000	80,000	25	*	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Hukill, G. S.	Colo.	3,288	1,000,000	100,000	10	*	.....	.....	.....	80,000	Sept.	1877	0 10	12	3⅜	..	..	..	3⅛	..	..	..	..	..	..	..	200
Indian Queen, S.	Nev.	1,000	3,000,000	60,000	50	....	.....	.....	.....	60,000	Dec..	1875	0 50	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Julia Cons., G. S.	Nev.	3,000	11,000,000	110,000	100	440,000	Aug.	1877	1 00	....	.....	.....	.....	..	2¾	..	2½	..	..	..	2⅜	..	3	..	3	..	700
Justice, G. S.	Nev.	2,100	10,500,000	105,000	100	1,817,500	Aug.	1877	1 50	....	.....	.....	.....	..	..	..	17¼	..	..	..	18½	..	18⅜	..	20	..	500
Kentuck, G. S.	Nev.	95	3,000,000	30,000	100	270,000	Dec.	1874	1 00	1,252,000	Mar.	1870	5 00	..	6¼	6⅛	..	..	7⅛	..	5½	..	5¼	..	6¼	..	800
Kosuth, G. S.	Nev.	2,700	5,400,000	108,000	50	421,200	Aug.	1877	0 15	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Lacrosse	Colo.	3,900	1,000,000	100,000	10	*	.....	.....	.....	....	.....	.....	.....	..	33c	31c	36c	33c	33c	32c	33c	32c	30c	..	35c	31c	17,900
Leopard, L. G. S.	Nev.	1,500	5,000,000	50,000	100	100,000	July.	1877	50	162,500	Dec..	1876	0 50	..	..	..	1¾	..	2	..	1¾	..	1½	..	1¾	..	1,200
Lucerne Mining	Colo.	4,200	5,000,000	500,000	10	*	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Mariposa, preferred	Cal.	44,387	5,000,000	50,000	100	1,425,000	June	1877	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
" common	"	acres.	10,000,000	100,000	100	1,425,000	June	1877	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Memphis	Colo.	6,000	300,000	60,000	5	*	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Merrimac, S.	Mass.	1,500	500,000	50,000	10	*	.....	.....	.....	85,000	Sept.	1877	40c	12	..	..	..	..	..	..	..	..	..	..	..	..	....
Mexican, G. S.	Nev.	600	10,080,000	100,800	100	151,440	Aug.	1877	0 30	....	.....	.....	.....	..	10¾	..	..	..	10¾	..	11	..	11¼	11¼	..	..	800
Moose	Colo.	39,000	2,000,000	200,000	10	....	.....	.....	.....	50,000	Sept.	1877	0 25	..	5½	5⅜	5⅜	5⅛	5¾	5¼	5¾	5⅜	5⅝	5½	5⅝	5½	19,500
N. Y. & Colo., G.	Colo.	..	1,000,000	50,000	20	*	.....	.....	.....	20,000	Mar.	1877	0 20	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Northern Belle, S.	Nev.	1,600	5,000,000	50,000	10	....	.....	.....	.....	1,350,000	Aug	1877	1 00	..	20¼	..	20	..	21½	..	22	..	21½	..	21½	..	200
Ontario.	Utah	3,000	10,000,000	100,000	100	....	.....	.....	.....	500,000	Sept	1877	1 00	6	21⅞	..	..	..	22	21⅞	22⅛	22	..	..	22¼	22⅛	500
Ophir, G. S.	Nev.	675	10,080,000	100,800	100	2,234,400	May.	1873	2 00	1,394,400	Mar.	1874	4 00	..	17	..	..	..	17¾	..	17½	..	17¾	..	18	..	1,000
Original Comstock, G. S.	Nev.	....	10,000,000	10,000	100	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	600
Overman, G. S.	Nev.	1,200	3,840,000	38,400	100	2,457,680	June	1877	3 00	....	.....	.....	.....	..	24⅜	..	..	..	27¼	..	..	..	..	..	..	..	....
Pleasant View, G.	Colo	1,200	200,000	20,000	10	*	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	100
Quicksil. preferred	Cal.	8,500	4,291,300			*	.....	.....	.....	....	.....	.....	.....	..	35⅞	35½	35	34½	34¾	34½	36	..	36	35⅛	36	35⅜	....
" common	"	acres.	5,708,700	100,000	100	....	.....	.....	.....	....	.....	.....	.....	..	22	21⅞	21⅞	21½	20¾	20½	..	..	20⅜	..	..	..	2,300
Raymond and Ely, G. S.	Nev.	5,000	3,000,000	30,000	100	540,000	Dec.	1876	1 00	3,075,000	Sept.	1873	3 00	..	..	..	..	..	..	..	..	..	..	..	..	..	800
St. Joseph, L.	Mo.	9600 acs.	1,000,000	100,000	10	....	.....	.....	.....	250,000	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Santiago, G. S.	Nev.	2,000	11,200,000	112,000	100	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Savage, G. S.	Nev.	800	11,200,000	112,000	100	3,408,500	Sept.	1877	1 00	4,460,000	June	1869	3 00	..	7½	..	7⅜	..	..	..	..	..	..	..	..	..	300
Seaton, G. S.	Colo.	1,700	500,000	50,000	10	*	.....	.....	.....	10,000	May.	1877	0 10	12	..	..	85c	..	83c	80c	90c	83c	..	..	90c	86c	1,800
Seg. Belcher, G. S.	Nev.	160	640,000	6,400	100	244,800	Apr.	1876	5 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Sierra Nevada, G. S.	Nev.	3,650	10,000,000	100,000	100	1,750,000	Aug.	1877	0 50	....	Jan..	1871	1 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Silver City, G. S.	Nev.	3,900	6,310,000	63,100	100	15,775	Nov.	1876	0 25	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Silver Hill, G. S.	Nev.	5,400	5,400,000	54,000	100	972,000	July.	1877	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
South Comstock, G. S.	Nev.	1,500	10,000,000	100,000	100	54,000	Jan	1877	0 25	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
South. California, G. S.	Nev.	1,500	5,000,000	50,000	100	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Southern Star, G. S.	Nev.	1,500	6,000,000	600,000	100	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Trenton, G. S.	Nev.	..	10,000,000	100,000	100	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Union Cons., G. S.	Nev.	850	10,000,000	100,000	100	260,000	Mar.	1876	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
West Belcher, G. S.	Nev.	1,000	10,000,000	100,000	100	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Yellow Jacket, G. S.	Nev.	1,200	12,000,000	120,000	100	2,958,000	July	1877	1 00	2,184,000	Aug.	1871	2 50	..	..	..	10	..	10¾	..	..	..	..	..	..	..	....
Young America, G. S.	Nev.	1,000	3,000,000	30,000	100	6,000	Oct..	1876	0 20	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	200
Copper Stocks.																										
Allouez, C.	Mich.	..	1,000,000	20,000	50	940,000	May.	1876	5 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Calumet & Hecla, C.	Mich.	..	2,000,000	80,000	25	1,200,000	.....	.....	.....	11,850,000	Aug.	1877	5 00	20	..	..	..	..	..	..	..	..	..	..	..	..	....
Central, C.	Mich.	..	500,000	20,000	25	100,000	June	1862	0 65	1,160,000	Feb.	1877	7 00	28	..	..	..	..	..	..	..	..	..	..	..	..	....
Copper Falls, C.	Mich.	..	1,000,000	20,000	50	535,000	May.	1876	.....	100,000	Nov.	1871	1 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Dana, C.	Mich.	..	500,000	20,000	25	68,000	Jan..	1863	0 50	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Dawson, S.	Ont.	..	1,200,000	60,000	20	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Duncan, S.	Ont.	..	1,200,000	60,000	20	75,000	July.	1876	41⅔	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Franklin, C.	Mich.	..	500,000	20,000	25	360,000	June	1876	5 00	585,000	Nov.	1871	1 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Humboldt, C.	Mich.	..	500,000	20,000	25	100,000	Sept.	1876	0 15	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
International, S.	Ont.	..	1,200,000	60,000	20	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Madison, C.	Mich.	..	500,000	20,000	25	123,000	Sept.	1876	0 10	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Mesnard, C.	Mich.	..	500,000	20,000	25	160,000	Apr.	1876	0 50	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Minesota, C.	Mich.	..	1,000,000	20,000	50	436,000	June	1869	1 00	1,820,000	Mar.	1876	0 50	..	..	..	..	..	..	..	..	..	..	..	..	..	....
National, C.	Mich.	..	500,000	20,000	25	195,000	Oct..	1875	1 00	360,000	Oct..	1873	1 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Osceola, C.	Mich.	..	1,000,000	40,000	25	880,000	May.	1870	2 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Petherick, C.	Mich.	..	500,000	20,000	25	165,533	Mar.	1876	0 50	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Pewabic, C.	Mich.	..	500,000	20,000	25	185,000	June	1868	3 00	460000	July	1873	1 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Phœnix, C.	Mich.	..	1,000,000	20,000	50	817,500	Sept.	1870	3 00	20,000	Jan.	1876	1 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Quincy, C.	Mich.	..	200,000	20,000	10	....	.....	.....	.....	2,130,000	Feb.	1877	4 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Ridge, C.	Mich.	..	500,000	20,000	25	200,000	.....	.....	.....	90,000	Feb.	1875	1 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Rockland, C.	Mich.	..	500,000	20,000	25	495,000	Jan..	1874	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Star, C.	Mich.	..	500,000	20,000	25	265,000	Mar.	1876	0 50	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Superior, C.	Mich.	..	500,000	20,000	25	340,000	Mar.	1874	0 25	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....

G. Gold. S. Silver. L. Lead. C. Copper. * Non-Assessable.

Total Assessments levied to date	$46,204,310	Total Sales of Coal Stocks for the week	$351,686 shares.
Total Mining Dividends disbursed to date	123,486,084	Total Sales of Mining Shares for the week	84,780 "

Lead.—There has only been a retail business, aggregating 100 to 125 tons, at 4¾c. This is the price to-day, but it is quite nominal.

Spelter and Zinc.—There has been a fair business in spelter, at 5⅞@6c. Makers of New Jersey spelter report a liberal demand for abroad, for war purposes. Numerous sample lots have lately been sent out. Sheet zinc has also been in good demand, and is firmer. We quote 7¾@8c.

Antimony.—We note a sale of 10 casks, at 12c., and quote the market. with a liberal business, at 12c. @12¼c., gold The London quotation is now £48.

Quicksilver.—The San Francisco *Commercial Herald* of Sept. 20 says: "The O. and O. steamship *Oceanic*, from Hongkong, is to hand with a return shipment of 1,000 flasks. Whether the other 5,000 flasks bought at the same time by the same parties and for California account, will be sent to this coast, is not generally known to the public. We hear of freight being engaged for New York for 500 flasks, per *David Crockett*, the owners unwilling to sell here for less than 55c., while other parties would gladly accept 50c.; in fact, we have heard of an offer to sell on the street of 1,000 flasks for October delivery at 45c., but this, we think, must have been a 'bluff.' Since our last reference we know of a purchase at 48½c. cash, and on the same day sales were actually made at 52½c. We mention this to show how very unstable our market is, it being manipulated by a horde of brokers who are constantly running hither and yon to find customers or to make a business turn. Spot stocks are light at the moment. The London quotation is still given at £7 10s. per flask, at which price it can be delivered in New York at 46c. We must therefore continue to look abroad for a market. The steamer *City of Panama* carried en route to Callao 100 flasks. The receipts for the week, 954 flasks. Closing price nominal."

Salt Lake Ore and Metal Market.

SALT LAKE CITY, UTAH, Sept. 28, 1877.

The market is very dull and quiet, and while the following quotations are nominal at not over $50, no buyers can be found for round lots at above $40 and $1.17.

Argentiferous Lead (Base Bullion).—$50 per ton for lead; $1.18 per ounce for silver; $20 per ounce for gold. The quotations for silver are based upon the silver contents in the lead of 80 to 120 ounces per ton of 2,000 lb.

The *Inter-Ocean's* correspondent under date of the 21st inst. says: "A sale of one car of bullion was made yesterday, that average 261 ounces of silver and one ounce in gold, at the rate of $45 per ton for lead, $1.17 per ounce for silver, and $20 per ounce for gold. This is the lowest price lead ever touched in this market."

FINANCIAL.

New York Stocks.

NEW YORK, Friday Evening, Sept. 28, 1877.

There have been quite liberal dealings in the coal shares during the week under review. The resumption of work at the Wilkes-Barre mines, and prospects of starting at the other mines, in connection with a realization that there were no grounds for the recent advance in the prices of the stocks, has brought on a steady decline. The sales of Delaware & Hudson Canal Company have aggregated 40,945 shares, at 48¼ to 39¼, closing at 41¼; of Delaware, Lackawanna & Western Railroad, 247,595 shares, at 51¾ to 43⅝, closing at 45⅛; of New Jersey Central, 1,733 shares, at 17⅞ to 14¾, closing at 15½.

Danville, Hazleton & Wilkes-Barre Railroad. With reference to the future of this road after a foreclosure of the mortgages, it is stated that the company is to be reorganized, and by an arrangement with the Pennsylvania Railroad Company, the road will be completed to Wilkes-Barre. Nearly all the bondholders sanction this arrangement.

Cumberland Valley Railroad Company.—An election for President and Directors of this company will be held October 1, at Harrisburgh, Pa.

Pennsylvania Steel Company.—The annual meeting of this company will take place Oct. 3.

Himrod Furnace Company.—The annual meeting of the company will be held on the 9th of Oct.

Union White Lead Manufacturing Company.—The annual meeting of this company for the election of officers takes place October 1st.

COUPONS AND INTEREST on the bonds of the following companies will fall due during the month of October:

Albany & Susquehanna Railroad Company.—Consolidated mortgage bonds, coupons and registered, and second mortgage. Interest paid by Delaware & Hudson Canal Company.

Allegheny Valley Railroad Company.—7 per cent. bonds. Interest.

Atchison, Topeka & Santa Fe Railroad.—Coupons.

Baltimore & Ohio Railroad Company.—6 per cent. bonds, sterling. Coupons.

Buffalo, Oil Creek Cut Railroad Company.—Coupons due.

Chesapeake & Ohio Canal.—Maryland loan. Coupons.

Columbus & Hocking Valley Railroad Company.—Sinking Fund bonds. Coupons.

Delaware, Lackawanna & Western Railroad Company—Morris & Essex Railroad, Newark & Bloomfield Railroad, and first mortgage bonds of Syracuse, Binghamton & New York Railroad. Interest and coupons.

Delaware & Hudson Canal Company.—Bonds of 1894, coupons and registered bonds of 1894. Interest.

Huntingdon & Broad Top Mountain Railroad Company.—First mortgage, gold; coupons.

Newark & Bloomfield Railroad Company.—Coupons paid by Delaware, Lackawanna & Western Railroad Company.

New Jersey Railroad & Transportation Company.—Coupons.

Oxford Iron Company.—Coupons.

Piedmont Railroad Company.—Coupons.

Syracuse, Binghamton & New York Railroad Company.—First mortgage; coupons paid by Delaware, Lackawanna & Western Railroad Company.

Vulcan Iron Works.—Coupons.

The National Tube Works Company of Boston has declared a dividend of $3 per share.

Miscellaneous Sales and Quotations.

Sales and quotations of the stocks and bonds dealt in here at Philadelphia, and Baltimore for the week ending the 29th inst. are given in the following tables. The Philadelphia quotations will have a * affixed. The Baltimore quotations are indicated thus †.

STOCKS.

	Quotations. Highest.	Lowest.	Closing.	Sales Shares
American Coal Co	—	—	30	—
*Cambria Iron Co	—	—	55	—
*Pennsylvania Salt Manf'g Co.	—	—	60	—
*Westmoreland Coal Co	—	—	60	—
*Buck Mountain Coal Co	—	—	25	—
*Schuylkill Nav. Co	—	—	—	—
St. Louis, I. M. & S. RR. Co	7	6	—	420
Spring Mountain Coal Co	—	—	30	—
†Balt. & Ohio RR. Co. pref	103	103	—	30
" " " common	111	110½	—	406
†Pittsburg & Connellsville RR.	—	—	—	—
†George's Creek Coal Co	—	—	96	—
†Santa Clara Mining Co	—	—	7	—
†Atlantic Coal Co	—	—	1.35	—

BONDS.

D., L. & W. 7s, Convt.,	1892	J. & D.	—	—	100	—
" " 2d mtge.,	1881	M. & S.	—	—	104	—
N. J. C., 1st mtge., new		F. & A.	110½	—	108¼	1,000
" " 1st mt., cons.	1893	Q.	69	68	69	3,000
" " Convt		M. & N.	64¾	63¼	63¾	21,000
L. & W. B. Coal Co., cons.		Q.	34	32	30½	9,000
Am. Dock & Imp. 7s		J. & J.	—	—	48	—
D. & H. C. Co., 1st m.,	1884	J. & J.	59½	—	—	1,000
" " " " "	1891	J. & J.	100	99	98	11,000
" " " " "	1877	J. & J.	—	—	102⅝	—
" " " " reg.,	1894	A. & O.	—	—	100¾	—
" " " " coup.,	1894	A. & O.	—	—	—	—
St. L.I. M. & S., 1st mt.	1892	F. & A.	96	—	—	10,000
Ches. & Ohio, 1st mt.,	1899	—	23	—	22	1,000
*L. V. RR., con. m. 6s,	1923	J. & D.	—	—	93	—
" " 2d m., 7s,	1910	M. & S.	110⅜	—	110¼	1,000
" " reg.,	1898	J. & D.	—	—	108½	—
" " coup.,	1898	J. & D.	108¾	—	—	1,000
*P. RR., 1st mtge.,	1880	J. & J.	—	—	—	—
" Gen. mtge. reg.,	1910	A. & O.	—	—	—	—
" Con. m. 6s, cou..	1905	J. & D.	—	—	91	—
" " " reg.	1905	Q.	91	—	91¼	1,000
" gen. M. Coup.,	191c	J. & J.	106¼	—	—	1,000
" New Loan 5s		—	108½	108	—	9,000
*P. & R. RR., 7s,	1893	A. & O.	—	—	—	—
" " con. m. 7s. cou.	1911	J. & D.	102½	102¼	102½	7,000
" " Deb. 6s,	1893	J. & J.	48	—	—	1,400
" " New convt. 7s.	1893	J. & J.	60	*30	59	8,800
" " Con. mtge. 7s. reg.		J. & D.	102	—	102¾	1,000
Income 7s	1896	J. & D.	—	—	—	—
*P. & R. C. & I. Co. Deb. 7s		M. & S.	—	—	—	—
*P. & R. C. & I. Co		—	—	—	—	—
*L. C. & N. Co. 6s.	1884	M. & Q.	—	—	102	—
" " RR. loan	1897	F. & Q.	104½	104	104	100
" " Con. mtge. 7s.		J. & D.	—	—	—	—
" " Cvt. gold,	1894	M. & S.	—	—	—	—
" " Gold Loan,	1897	J. & D.	90	88¼	89	6,000
Schuylkill Nav., 6s.	1897	M. & Q.	—	—	—	—
Pa, and N. Y. Canal, 7s		J. & D.	109	—	—	5,000
Pa. Canal Co		J. & J.	62	—	—	1,000
Susquehanna Coal Co. 6s.		—	—	70	—	3,000
Ches. & Ohio 1st m. 6s		M. & N.	—	—	—	—
Balt. & Ohio 6s.	1880	J. & J.	—	—	102½	—
" " 6s.	1885	A. & O.	—	—	107	—

Total transactions for the week $103,300

* 300 shares ex-coupon.

Philadelphia Stocks.

PHILADELPHIA, FRIDAY EVENING, Sept. 28, 1877.

About 60,000 shares of stock have changed hands during the past week on the Philadelphia market. Prices in all instances are lower, Philadelphia & Reading closing at 15⅜, a decline of over 2 per cent.; Pennsylvania Railroad at 28⅞; Lehigh Valley, 39½; and Lehigh Coal and Navigation Company, 18⅝. The latter stock has been very sparingly dealt in, the transactions scarcely reaching 1,000 shares.

COUPONS AND INTEREST on the bonds of the following companies will fall due during the month of October:

Cumberland Valley Railroad.—Interest.

Junction Railroad Company.—Interest.

Little Schuylkill Railroad Company.—7 per cent. mortgage loan of 1877; interest.

Morris Canal & Banking Company.—Boat loan; interest paid by Lehigh Valley Railroad.

North Pennsylvania Railroad Company.—Chattel mortgage; coupons.

Oil Creek and Alleghany River Railroad Company.—1st mortgage; coupons due.

Oil Creek Railroad Company.—1st mortgage; coupons.

Pennsylvania Railroad Company.—General mortgage; registered bonds; interest.

Pennsylvania & Delaware Railroad Company.—Coupons.

Philadelphia & Reading Railroad Company.—Loan mortgage; coupons.

United New Jersey Railroad's regular bonds of 1894; interest.

Thomas Iron Company.—Two hundred shares of this company's stock were sold at auction during the week at $25¼ per share.

Pennsylvania Canal Company.—Two hundred and three shares of this stock were sold at auction during the week; par, $50, at 1c. per share.

Dazell Oil Company.—Three hundred shares of this company's stock were sold during the week at auction; par, $2; at 3c. per share.

River Oil Company.—One thousand shares of this company's stock were sold at auction during the week, par; $10, at 1c. per share.

Danville, Hazelton & Wilkes-Barre Railroad.—Four thousand five hundred of the 7 per cent. mortgage of this company's bonds were sold at auction during the week at 25 per cent.

Copper Stocks.

Reported by Wilson W. Fay & Co., Bankers and Brokers Room 7, Traveler Building, 31 State Street.

BOSTON, THURSDAY EVENING, Sept. 27, 1877.

There has been a decided falling off in the market this week, both in business and prices, the money market having hardened, with no disposition to loan, except on first-class securities, and then at fair rates.

There is no doubt but what there are parties around picking up the low-priced coppers quietly; not because they think they are actually worth anything, but they are willing to risk a little for the chance of doubling or quadrupling the sum invested, and as they must move upward, if they move at all, the chances are entirely in their favor.

Calumet & Hecla shows about the usual number of sales, notwithstanding the falling off in the others. The stock is steady and holds its own at about 174, although there was a decline during the week to 173, but it has stiffened again, and is now 173½ bid and 174 asked.

Copper Falls broke at 4.00 and has sold down to 3½, and is rather heavy at that figure; it closes 3⅝@3⅝. Franklin is steady and quiet at 8.00@9.00. Central, which was offered at 39, and no bidders, has found a bidder at 35, which does not make a very close market, and leaves the stock dull and uninteresting. Quincy has weakened somewhat although there have been no sales, and closes 37 bid and 37¾ asked. Ridge is steady at 2⅛@2⅜, and rather quiet. The other coppers remain unchanged, and are dull but firm. In the silvers, Duncan has declined to 1½ bid and 1¾ asked, and few sales. International dropped to .26 and sold at that figure, and is now .26 bid and .28 asked. The activity of last week led us to anticipate a brisk market for the fall and winter months, but it is evident that the time has not arrived yet to expect a continued activity; but there is no doubt that a few outside orders, together with the growing disposition to trade, would open the campaign in earnest, and once started the ball will be kept rolling.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Sept. 28, 1877.

Outside of Bertha & Edith the sales for the week under review were greater than during the previous one. The feature of the week has been a decline in Bertha & Edith from 50½c., our closing price last week, to 29c. to-day, with sales for the week of 24,080 shares. This stock was quoted two weeks ago at about $1.30. Moose has held its old position in the business of the board. The sales have aggregated 19,500 shares at 5⅛@5⅝. Ontario has ranged from 21⅞@22¾, with sales of 1,000 shares. We have reports of a new and honest "deal" in Hukill and Seaton.

Ontario Silver Mining Company.—The bullion product of this company from Sept. 1 to Sept. 21, inclusive, was 62 bars; assay value, $130,336.12

MINING STOCK QUOTATIONS IN SAN FRANCISCO.

We give below a table showing the closing price of mining shares in San Francisco yesterday:

Alpha	14	Mexican	12
Belcher	6	Northern Belle	20
Best & Belcher	21	Ophir	17
Bullion	9	Original Comstock	..
Caledonia	4	Overman	24
California	30	Raymond & Ely	13
Chollar Potosi	37	Santiago	..
Con. Imperial	1	Savage	..
Con. Virginia	33	Seg. Belcher	8
Confidence	6	Sierra Nevada	39
Crown Point	5	Silver City	5
Eureka	45	Silver Hill	..
Exchequer	9	South Com. tock	5
Gould & Curry	10	South California	..
Hale & Norcross	18	Southern Star	..
Indian Queen	..	Trenton	..
Julia	3	Union Con	6
Justice	18	West Belcher	..
Kentuck	6	Yellow Jacket	10
Kossuth	..	Young America	..
Leopard	2		

The *Commercial Herald* of the 20th inst. says: "No improvement has taken place in the business of the San Francisco Board during the past week. and the general list of prominent stocks is more or less off, with quite a smart distribution of sales, considering the times, among the wild cat or worthless class of stocks. A most discouraging feeling just now pervades the stock dealing community mainly because there is such a poor prospect of a 'movement' in the near future. We hear of big discoveries in the lower

levels of the bonanzas, and then again that nothing but low grade ore is making its appearance, and that the dividends will soon cease. This non-payment of dividends has been the cry of the bears for months past, but still they come just as sure as the months pass round. It is a most marvelous output of bullion from month to month when we come to fully realize it, and the real wonder is that it has not ceased long ago as has been predicted by so many. The world has never known such a wonderful development, and the constant draft upon its ore deposits are so great as to produce a morbid fear that the bottom will and must drop out ere long, hence, perhaps, the present apathy in mining stock circles. We are of the opinion that even an increased yield from the bonanzas, or even a more marked than usual discovery in their lower depths, would not materially put up the prices in the general list. We must have other developments on the lode to effect this, and until then no sharp and active market can be looked for. A 'control' or 'concentration' at present must soon spend itself, for the reason that an inactive market is not beneficial to such operations."

The Gold Hill *News* of the 19th inst., in its review of the mines says: "Justice, Overman, and Julia are improving. The great bonanza of the Consolidated Virginia and California, shows constant improvement in both size and quality as further developed. The C. and C. drift, at the 1650-foot level, having been started again toward the west wall of the great ore channel, has passed through the small horse of porphyry in which it was stopped, and as was predicted by all experts and mining men nearly a year ago, it has run into another vein of good ore. It was stated and recorded at that time that this drift would have from 50 to 80 feet yet to run in order to reach the west wall, and if this view is correct it has thirty or forty feet yet to run, and as it is still in ore, more ore may be expected.

Regarding a possible compromise between the mine managers and the Sutro Tunnel Company, the Lyon County (Nev.) *Times* gives the following as the probable plan of operations, should an arrangement be effected: "The drift now being run east from the Chollar to the Chollar-Norcross-Savage combination shaft will be completed. A drift will also be run from the combination shaft to the Sutro Tunnel. When these connections are made, the water which now impedes operations in the Best & Belcher, Gould & Curry, Savage, and Hale & Norcross, will be pumped from mine to mine into a reservoir in the Chollar. Thence it will run through the east drift to the combination shaft, and thence into and out by the Sutro Tunnel. As the water will only have to be raised to the 1,700-foot levels of the above mines, an immense power can be brought to raise it. Water pressure from above could be used to run the pumps instead of steam, and a great saving in expenses would be made."

The same paper says: "It is rumored that Adolph Sutro will erect a 40-stamp mill at the mouth of the tunnel within 90 days. Well informed parties assert that a ledge has been passed through or penetrated by the Sutro Tunnel that is over 20 feet wide, and assays about $100 to the ton. This may account for the erection of the proposed mill."

Tybo Consolidated Silver Mining Company.—The *Eureka Sentinel* of the 9th inst. says: "We learn that orders have been issued to the Superintendent of this company, commanding him to suspend all operations, both at the mines and furnaces. This is an unlooked for move, and will be bad news for our neighbor, but we learn that the suspension will not last longer than two months. Dissensions among the owners is given as the cause of the action."

The Eberhardt and Aurora Silver Mill, at Hamilton, Nevada, has started up for a two months' run.

Eureka Consolidated Silver Mining Company.—This company recently made a run for the twenty-four hours of 106,970 pounds of bullion, or a trifle over 53 tons for the day. Its estimated value is in the neighborhood of $14,000, and the yield is the largest in the history of the works.

The stock of this company closed in San Francisco yesterday at $45 per share.

The Black Bear Quartz Mining Company of California has declared a dividend of 40c. per share.

The Leeds Mining Co., of Utah, has declared a dividend of 20 cents per share.

The Northern-Light Mining Company of Shasta County, California., has levied its first assessment of 15c. per share.

The Kennedy Mining Company of California, has levied an assessment of 25c. per share.

The Kelsey Mining Company of California has levied an assessment of 20c. per share.

The Franklin Mining Company has levied an assessment of $1 per share, delinquent Oct. 17.

The Consolidated Amador Mining Company has declared a dividend of 25c. per share.

The Prospect Mining Comyany has levied an assessment of 40c. per share.

The Leviathan Mining Company has levied an assessment of 25c. per share.

The Martin White Silver Mining Company. has levied its second assessment of $2 per share. This, it is presumed, will remove the company's debt.

The Segregated Rock Island Mining Co. has levied an assessment of 5 cents per share delinquent October 19.

The South Navajo Mining Co. has levied an assessment of 10 cents per share delinquent October 17.

The Kentucky Ridge Mining Co. has levied an assessment of 20 cents per share delinquent October 19.

The Remington Gravel Mining Co has levied an assessment of 20 cents per share delinquent Oct. 15.

Gas Stocks.

NEW YORK, FRIDAY EVENING, Sept. 28, 1877.

The Brooklyn gas stocks are firm at quotations. In some instances we advance prices. New York quotations are nominally unchanged, with no transactions reported.

Pottsville, Pa.—The high price charged for gas in this place is having the effect of driving many of the merchants to using petroleum.

Cheap Gas.—One of the London gas companies has just reduced its price of gas to seventy cents a thousand feet.

People's Gas Co., of Baltimore.—100 shares of this stock were sold during the week at 14½ per cent.

Metropolitan Gas-Light Company.—$200 of the scrip certificates of this company were sold at auction during the week at 103 per cent., also 5 shares of stock at $135½ per share.

Atlantic City (N. J.) Gas and Water Company.—$1,000 of the 7 per cent. bonds of this company were sold at auction during the week at 96 per cent.

COUPONS AND INTEREST on the bonds of the following companies will fall due during the month of October:

Cedar Rapids, Iowa, Gas-Light Company.—Coupons.

Clinton Gas-Light and Coke Company.—Coupons.

Citizens', Brooklyn, Gas Company.—Interest on certificates.

Hyde Park, Chicago, Gas-Light Company.—Coupons.

Memphis, Tenn., Gas-Light Company.—Coupons.

Nebraska City Gas-Light Company.—Coupons.

Northwestern Gas-Light and Coke Company.—Coupons due.

Yonkers Gas-Light Company.—Coupons.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas stocks, No. 30 Broad street, N. Y.

Companies in New York and vicinity.	Capital Stock.	Par.	Dividends. Rate per an.	Dividends. Am. of last.	Dividends. Date of last.	Quotat'ns Bid.	Quotat'ns As'd
	$						
Mutual, N. Y.	5,000,000	$100	10%	2½	July '77	95	96
" Gold Bonds	90,000	1,000	7%	3½	Feb. '77		107
N. York "	4,000,000	....	10%	5	May '77	128	130
Metrop. "	2,500,000	100	10%	5	June '77	125	128
" " Certf.	1,000,000	....	7%	3½	" '77	100	103
" " Bonds	500,000	1,000	7%	3½	" "	102	—
Harlem "	1,850,000	50	8%	3½	Aug. '77	95	100
Manhat. "	4,000,000	50	....‡	5	July '77	198	200
Brooklyn, B'klyn.	2,000,000	52	15%	5	July '77	165	175
Nassau, "	1,000,000	25	....‡	4	July '77	78	80
" " Certf.	700,000	1,000	7%	3½	July '77	98	101
People's, "	1,000,000	10	....‡	3½	July '76	—	45
" " Certf.	300,000	1,000	7%	3½	July '77	80	85
" " B'ds	325,000	....	7%	3	Feb. '77	96	100
Metrop. "	1,000,000	10	5%	2½	May '77	67½	72
Wmsb'rg "	1,000,000	50	10%	2½	Apr. '77	115	122½
" " Certf.	1,000,000	....	7%	3½	July '77	100	102
Citizen's "	1,200,000	20	....‡	4	Jan. '77	70	75
" " Certf.	320,000	1,000	7%	3½	Apr. '77	97	100
J. C., N. J.	750,000	20	10%	5	July '77	160	—
Cent. Westch. N.Y	466,000	50	7%	4	July '77	80	90
Subur'n "	295,000	50	7%	3½	Apr. '77	90	100
Municipal, N.Y.	1,500,000	100	.....	.....	.....	75	85

‡Paid irregularly.

ADVERTISERS' INDEX.

Air Compressors:
Clayton, James, Brooklyn, N.Y. iii
Norwalk Iron Wks. Co., S. Norwalk. —
Rand & Waring, New York x

Assaying Tools and Chemicals:
Benjamin, E. B., New York vi
Boulter's Superior Muffles, Phila. 252
Burlingame, E. E. & Co., Denver, Colo. i
Kalb, Theo., St. Louis, Mo. vii
Riethmann J. J., & Co., Denver, Colo. 252

Attorneys and Counsellors:
Bloss, John B., Washington. D. C. vii
Britton & Gray, Washington, D. C. vii
Mendenhall, W. K., Washington, D. C. vii
Morrison & White, Georgetown, Colo.. vii
Riley, Henry A., New York vii

Bankers and Brokers:
Tracy, Arnold & Co., New York 252
Van Deventer & Patton, New York 252

Blasting Powder:
Laflin & Rand Powder Co., New York. viii
Oliver, Paul A., Wilkes-Barre, Pa. viii
Miners' Supply Co. (Blasting Squibs), i
Miners' Powder Co., New York x

Blowers:
Keystone Portable Forge Co., Phila., Pa. v

Books and Periodicals:
Capital and Labour, London, Eng. vii
Claxton, Remsen & Haffelfinger, Phila. v
Colliery Guardian, London, Eng. vii
El Minero Mexicano, New York vii
La Houille, Paris, France vii
Smith, Fred. H., Baltimore, Md. i
Spon, E. and F. N., New York iv
Teknish Tidskrift, Stockholm, Sweden. vii
Van Nostrand's Engineering Works... iv
Van Nostrand's Eclectic Magazine, N.Y. viii

Cement:
Fleming, Howard, New York viii
Merchant, Anderson, & Co., New York.. ix

Coal:
Berwind, White & Co., New York viii
Borda, Eugene (Koh-i-noor Coal), Phila ix
Borden & Lovell, New York viii
Brown, S. H. & Co., New York viii
Cannelton Coal Co., Philadelphia... .. ix
Coxe Bros. & Co., New York ix
Cox & Boyce, New York viii
Heissenbuttel & Wells, New York.. .. ix
Hoboken Coal Co., New York ix
Kanawha Coal Lands For Sale ix
Kittaning Coal Co., Philadelphia, Pa... viii
Lehigh Valley Coal Co., New York.... viii
Maryland Coal Co., New York ix

Page.
Pardee, A. & Co., New York ix
Phila. & Reading Coal & Iron Co.... viii
Shaw, Brothers, Baltimore, Md x
Swords, A. S., New York viii
Talbot, Richmond, New York ix
Williams, R. H., New York viii

Coal and Ore Separators:
Bradford, H., Philadelphia x
Fraser, Chalmers & Co., Chicago, Ill.. vi
Krom, Stephen R., New York ii
Wetmore, George C., New York ii

Copper Works
Pope, Cole & Co., Baltimore, Md 252

Engineers and Chemists:
Courtis, Wm. C., Wyandotte, Mich vii
Degenhardt, G. C Louis, New York.. vii
Garbutt, Abbott Bros., & Woodward, Lake City, Colo. vii
Hale, A. W., New York vii
Hartleben, Otto, Georgetown, Colo. vii
Hill, John W., Hamilton, O. vii
Johnson, Albert, Georgetown, Colo. vii
Keyes, W. S., San Francisco, Cal. vii
Marsh, George E., Georgetown, Colo.. vii
Morton, J. H., Brooklyn, N. Y. vii
Neu, Gus. S., New York vii
Nicolls, William J., Baltimore, Md. vii
Randolph, John C., New York. vii
Reichenecker, Albert, Fairplay, Colo... vii
Rothwell, Richard P., New York. vii
Sayr & Parmelee, Georgetown, Colo... vii
Teal, Foster & Co., Georgetown, Colo. vii
Vinton, Genl. F. L., Denver, Colo. vii
Wilson Bros. & Co. Philadelphia vii
Woods, Wm. H. Caribou, Colo. i
Wurtz, Professor Henry, Hoboken, N. J. vii

Engineers' Instruments:
Edgerton, N. H., Philadelphia vi
Gurley, W. & C. E., Troy, N. Y. ..... —
Heller & Brightly, Philadelphia vi

Fire Brick:
Colson, Chas. D., Chicago, Ill. 252
Evens & Howard, St. Louis, Mo. iv
Kreischer, B., & Son, New York 252
Mauer, Henry, New York 252

Gas Process:
Mackenzie & Sayre Mfg. Co., New York. iv
Stevens, S. A. & Co. (Lowe Process), Philadelphia, Pa. ix

Hoisting Machinery:
Crane Bros. Mfg. Co., Chicago, Ill. iii
Copeland & Bacon, New York x

Hot Blast Stoves:
Whitwell's, Philadelphia 252

Page.
Hotels:
Crawford House, Colorado Sp'ngs, Colo. x
Teller House, Central City, Colo. x
Victoria Hotel, South Pueblo, Colo. x

Hydraulic Jacks and Punches:
Dudgeon, Richard, New York vi
Lyon, E., & Co., New York 252

Injectors:
Nathan & Dreyfus, New York i
Wilde, R. W., New York v

Locomotives:
Burnham, Parry, Williams & Co., Phila.. iii

Metal Brokers:
White, Edward P., New York ..... —

Mining Tools and Goods
Tritch, George, Denver, Colo. 252

Machinists' Tools & Machinery
Pratt & Whitney Co., The, Hartford, Ct. —
Wood & Light Machine Co., Worcester iii

Mineral Wool:
Elbers, Alexander D., New York 252

Mining, Crushing, Stamping, and Smelting Machinery:
Adams, B. C., Denver, Colo. v
Aitchison, R. & Co., Chicago, Ill iv
Baugh & Sons, Philadelphia, Pa. i
Black Hawk Foundry & Mach. Wks, Colo 252
Blake's Stone Breaker, New Haven.... vi
Copeland & Bacon, New York x
Copeland, Dodge & Co., New York.... iv
Council Bluffs Iron Works vi
Fraser, Chalmers & Co., Chicago, Ill... vi
Frue Vanning Machine, Chicago, Ill... v
Hartford Foundry & Mach. Co., Conn... vi
Hull & Belden Co., Danbury, Conn.... ii
Hendrie Bros. & Bolthoff, Central, Colo. iv
Krom, Stephen R., New York ii
Morey & Sperry, New York x
Morgan Iron Works, New York vi

Patents:
Stetson, Thomas D., New York ..... —
Lurmann, F., Germany ..... —

Pumps:
Carr, A., Selden Direct-Acting, N. Y... ii
Camerou, A. S., New York iii
Clayton, James, Brooklyn, ... iii
Crane Bros. Mfg. Co., Chicago iii
Davidson, M. T., New York iii
Harris Steam Pump, New York iii
Knowles Steam Pump, New York ..... —
Norwalk Iron Works Co. iii
Worthington, H. R., New York ii

Railroads and Transportation:
Atchison, Topeka & Santa Fe R.R. 252

Page.
Colorado Central RR. i
Denver & Rio Grande RR. 252
Denver, South Park & Pacific RR. 252
Pennsylvania RR. 252

Roofs, Girders, etc.:
Scaife, Wm. B., & Sons, Pittsburg, Pa.

Rock Drills:
Am. Diamond Rock Boring Co., N.Y. x
Burleigh Rock Drill Co., New York.... x
Ingersoll Rock Drill Co., New York.... x
Penn. Diamond Drill Co., Pottsville, Pa v
Rand & Waring, New York x

Rubber and Belting:
Gutta Percha & Rubber Mfg. Co., N. Y. ii
N. Y. Belting & Packing Co., New York ii

Safes and Scales:
Marvin Safe and Scale Co., New York.. i

Smelting and Refining Works:
Crooke Bros., New York iv
Steteieldt Furnace Co. San Francisco Cal vii
United Royal Smelting Works, N. Y... iv

Steam Engines:
Wilde, R. W., New York v

Steam Regulators:
National Iron Wks. N. Brunswick, N. J. iii

Steel Works:
Crescent Steel Works, Pittsburg, Pa... viii
Edgar Thomson Steel Co., Pittsburg, Pa. iii
Park, Bro. & Co., Pittsburg viii

Tubes and Pipes:
Abendroth & Root Mfg. Co., New York ii
National Tube Works, Boston, Mass... vi
Worthington, H. R., New York ii

Ventilators:
Keystone Portable Forge Co., Phila., Pa. v
Murphy, Francis, Philadelphia 252

Water Wheels:
Stout, Mills & Temple, Dayton, O. v

Wire Rope:
Channon, H. & Co., Chicago, Ill. iii
Hazard Mfg. Co., Wilkes-Barre, Pa.... iii
Mason John W. & Co., New York..... i

Miscellaneous:
Bailly, P., Brussels, Belgium vii
First National Bank of Georgetown, Colo iv
File Covers For Sale vi
Gold Lands For Sale i
Lead and Silver Mine for Sale i
Situation Wanted by a Mining Engineer. i
Wanted, Engineers' Transits i

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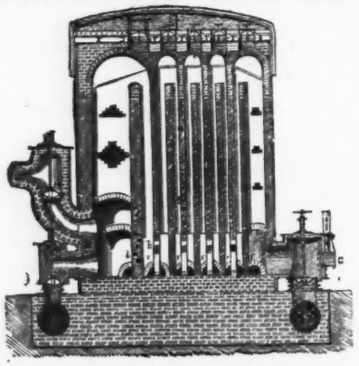

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